

CTO

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THE MAGAZINE FOR INFORMATION EXECUTIVES

SPECIAL SECTION

Strategic Outlook On Open Systems:

How Users
And Vendors
Are Making
Their Way
To the
Open Road



We've noticed recently that almost every computer manufacturer and software company is talking about one thing. Open systems.

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STRATEGIC OUTLOOK

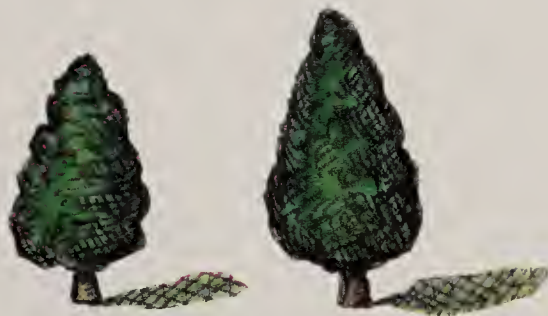
OPEN SYSTEMS

Open City

It used to be safe and easy to buy proprietary solutions from a single vendor. But it was also a little like living in a monastery. Now that the world is pluralistic, dispersed and improvisational, freedom means controlling your own destiny.

By David Freedman

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Out of the proprietary woods 45



*A pointed lesson 62
Cover photo of Michael Lanier
by David Powers*

Open Season

Everyone has an opinion when it comes to setting standards for open systems, which means the quest for uniformity is always confusing, sometimes acrimonious, and possibly very good for users.

By David Freedman

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The Open Road

Bowed, but not broken after an unfortunate early experience with Unix, DHL is embarking on an ambitious journey toward true open systems.

By David Freedman

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FEATURES

The Cotton Club

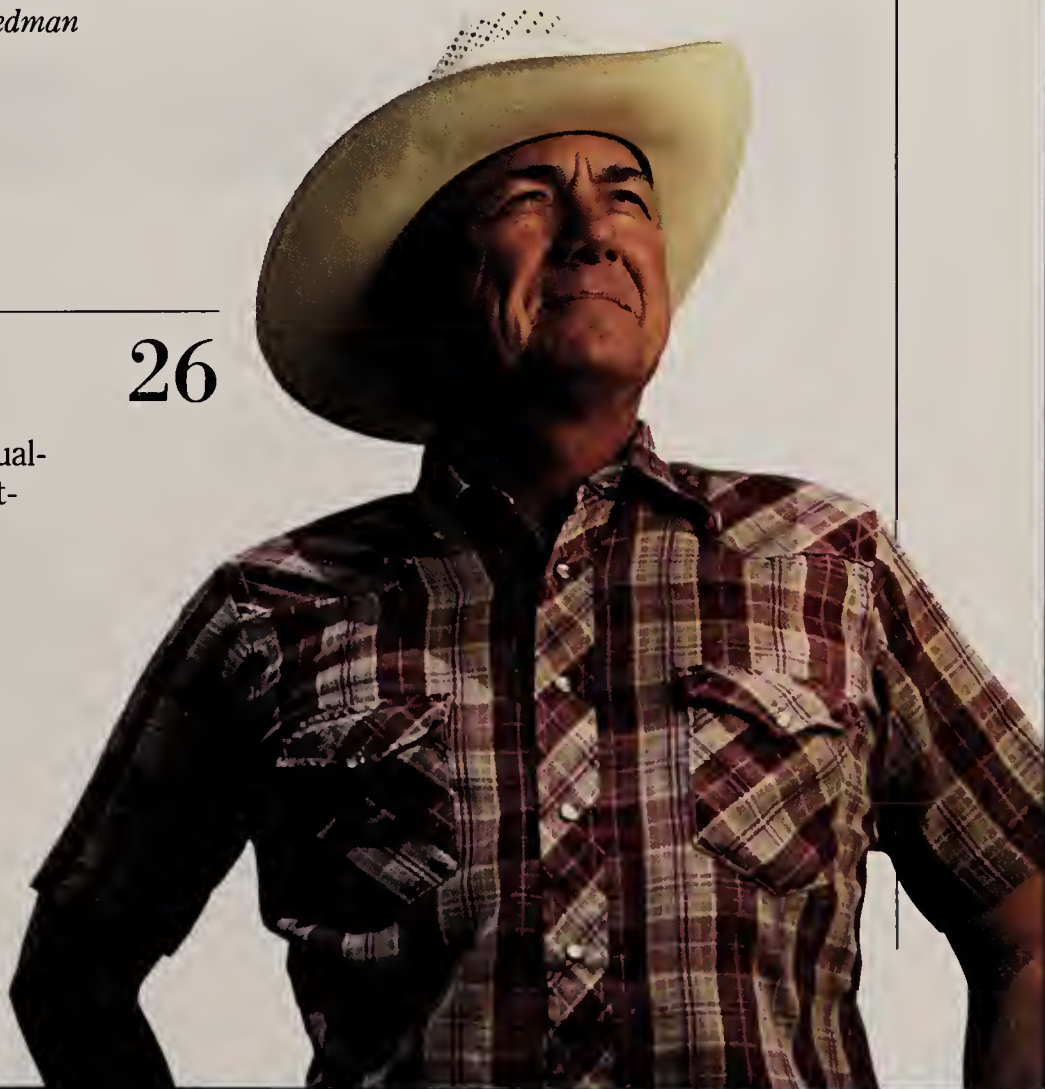
After centuries of one-on-one haggling, cotton growers and cotton merchants are finding it mutually advantageous to get together on a trading network and bargain electronically.

By Paul Konstadt

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A growing appreciation 26





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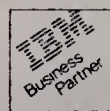
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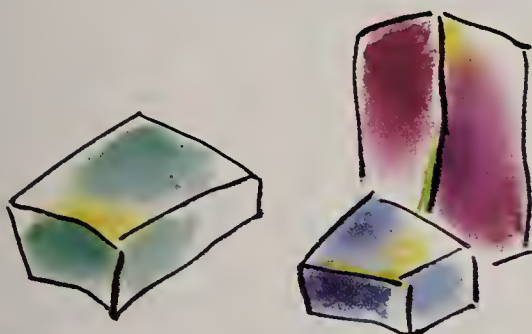
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INSIGHTS: THE VOICE OF THE USER

Faced with smarter users and more threatening competitors, IS needs a crash course in marketing if it hopes to survive.

By Rick Ono

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OUTLOOK: A WISE CONSISTENCY

How one Fortune 500 company cut costs, controlled inventory and reduced platforms through standardization.

By Tom Kelly

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STATE OF THE ART: IS THE PEN MIGHTIER?

Pen-based computing still has a few obstacles to overcome, but industry-watchers are predicting a brilliant future for this handy new technology.

By Kathleen Melymuka

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Yes, it's the middle of September and a second issue of *CIO* has arrived on your desk. No, the mail isn't late, and we are not early with our October issue. *CIO* has increased its frequency to 18 times per year. Subscribers will receive an additional issue of *CIO* this month and in October and November. Next year readers will receive two issues per month in April, May and June and in September, October and November. The second issue of each month contains our usual lineup of articles as well as a Strategic Outlook section comprising several articles that put into perspective topics of critical importance to information executives.

Our first Strategic Outlook, beginning on Page 45, examines open systems. In the past open systems have been equated with adopting the Unix operating system. However, CIOs seriously evaluating the move to open systems have found the process to be far more complex, requiring a redesigning of the organization's information technology platform. In most cases the new environment revolves around the client/server architecture, which really changes the way companies do business.

The advent of open systems has been touted as a utopia in which standards will guarantee a homeostasis among diverse computing platforms. The problem is that myriad organizations are mapping out open-systems fiefdoms. And it appears that information executives are becoming impatient waiting for standards to emerge. Instead of allowing confusion to reign and awaiting the pronouncements of the multitude of standards-setting bodies, CIOs are increasingly becoming involved in the standards-setting process. X/Open, for example, recently announced a major move to promote increased user involvement, and the User Alliance for Open Systems has also become an activist in the cause.

Contributing Writer David Freedman reports on the frustrations CIOs experience trying to meet the open-systems challenge. Don't be a fanatic about open systems, one executive warns. Keep those proprietary systems but find ways for them to operate with other systems. Freedman also profiles the pitfalls DHL Worldwide Express experienced during its foray into open systems.

In a recent conversation, the president of one standards-setting organization observed that the importance of open systems is just beginning to filter into the consciousness of many information executives. With the speed of change what it is today, the issue of open systems requires CIOs to take a proactive stance.

Marcia Blumenthal



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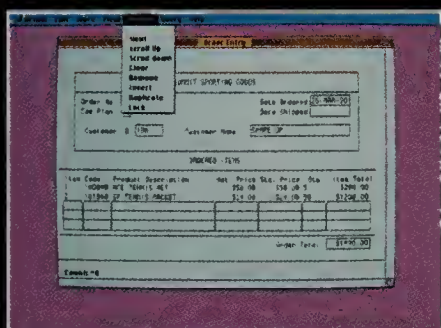
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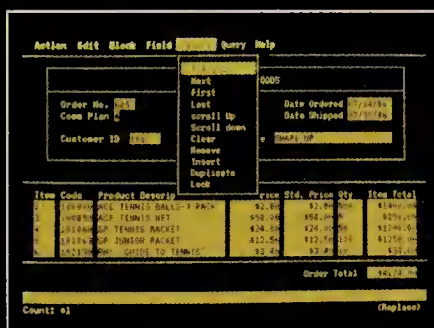
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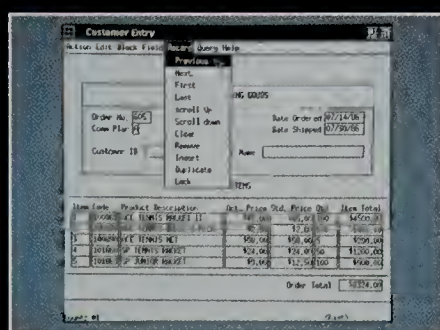
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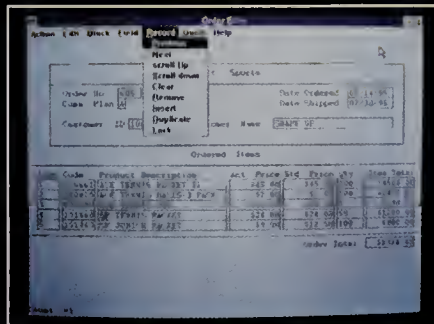
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MOTIF AND OPEN LOOK



BLOCK MODE



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It gives me great pleasure to see *CIO* Magazine boosting its frequency from 12 to 18 issues per year with this, our inaugural "second issue of the month."

The frequency increase is based on your feedback. You told us you need more information during your critical planning months of April, May, June, September, October and November. We listened and are now responding by bringing you two issues of *CIO* in each of those months.

In the two-issue months, the magazine will be published on the first and the 15th of the month. Both issues will contain the regular features, columns and departments you're familiar with. The issue published on the 15th will include an additional section on a strategic topic that you've identified as important.

In this issue, the "Strategic Outlook" is on open systems. The Oct. 15 issue will look at outsourcing, followed by a section on change management in the Nov. 15 issue.

At a time when many publications are decreasing frequency or closing up shop, it's truly gratifying to all of us at *CIO* to be moving ahead. It tells us we're meeting your needs. As always, I welcome your comments and feedback. Please call me at 508 935-4601. Or write to me at *CIO* Publishing in Framingham, Mass.

Stephen L. Levy

P.S. In an effort to better serve our readers, I'm pleased to announce our new toll-free Subscriber Services Hot Line. If you have questions about your subscription or need to make an address change, please call 800 788-4605.

Coming In CIO

Strategic Outlook: Outsourcing

A practical guide to outsourcing offers readers direction in deciding whether or not to outsource, choosing a vendor and negotiating a contract. Also: a textbook example of a successful outsourcing arrangement, and, for the stout of heart, horror stories about arrangements that went wrong.

Robocop Redux

Technology is making itself felt in law enforcement, from revolutionary techniques such as DNA "fingerprinting" to old reliables like relational databases. And IT should make it easier to catch and convict criminals—if the cops and the courts will accept it.

CASE in Question

Vague talk of productivity gains is no longer sufficient when it comes to justifying investments. As IS budgets shrink, CIOs are under new pressure to show real, measured value for CASE and other expensive development strategies.

Town and Gown

Universities with IS graduate programs are forming partnerships with companies that theoretically should benefit both sides. Representatives from business and academia discuss whether such alliances are making the grade.

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TRENDLINES

STATE GOVERNMENT

BRINGING ORDER TO THE COURTS

As any lawyer who's ever done a title search in Massachusetts knows, the state's record-keeping system is a shambles of overstuffed file cabinets and cartons crammed on dusty shelves, defying an orderly inquiry or an expeditious outcome. In fact, the entire state court system suffers from a lack of coherent automation, and in many instances from no automation at all.

IBM Corp. would change all that—though Big Blue's reformist zeal is raising some eyebrows in the state.

A recent *Boston Globe* story told of IBM's effort to write—with the help of politically well-connected lobbying talent—the legislation that would mandate systemwide computerization. (The *Globe* characterized the IBM bill as "futuristic," though the current infrastructure is so archaic that futuristic covers a lot of territory.) The article cited a report prepared by Harbridge House, a Boston-based consulting firm, which concluded that there is "an almost total lack of coordination across the Trial Court departments to institute good management information systems."

Despite agreement on the need to get serious about IT infrastructure, some suspect IBM of "using its political firepower to make a big score—a contract potentially worth \$35 million," wrote *Globe* staffer Brian C. Mooney.

If the bill were to be enacted, of course, the ensuing computerization project would be subject to competitive bid-

ding, and IBM would need to win the contract. An appealing wrinkle in the proposed legislation—especially in a state mired deep in recession—is the premise that much of the system's cost could be re-

enthusiastic about the legislation and discount objections to IBM's role in writing it. The *Globe* quoted Weld's chief counsel, Robert Cordy, as saying, "I don't care who came up with it; it's a fabulous idea." The article also noted that IBM is now computerizing the Pennsylvania court system, a project worth \$24.5 million.

An IBM spokesman contacted by *CIO* said such forays into the legislative realm are "not at all a common prac-



couped over time from user fees charged to lawyers for access to data. (Middlesex County in Massachusetts already collects fees from lawyers for access to its image-based registry of deeds system, which the county projects could eventually earn it \$400,000 in revenues annually [see "The Sharper Image," *CIO*, April 1991].)

Members of the administration of Gov. William Weld are

tice." When they do occur, he said, three questions need answering: "Is it good public policy? Is it good for IBM to be involved in it—meaning is there no possibility of a perception of conflict of interest? And will the situation not lead to a [single-vendor] source recommendation?" In the case of the proposed Massachusetts legislation, the spokesman said, the answers were all favorable. ■

CORRECTION

In our August issue, *CIO* erroneously referred to software maker Ashton-Tate as having become "mired in Chapter 11." Ashton-Tate, of Torrance, Calif., is not now and never has been in Chapter 11. Said company Chairman William P. Lyons, "Ashton-Tate has been profitable for the past four quarters and has a very strong balance sheet. The company has shipped several new versions of dBASE IV for a variety of hardware platforms and operating systems, and has reorganized to reduce costs." Since press time for the August issue, Ashton-Tate has entered into an agreement to be acquired by Borland International Inc., of Scotts Valley, Calif. *CIO* regrets the error. ■

CLIENT/SERVER

DREAM VS. REALITY

Is client/server computing happening or hype-ening?

In a recent survey by International Data Corp. concerning customer attitudes toward client/server computing, 32 percent of respondents reported that they have moved, are moving or plan to move to this new computing architecture. Yet 28 percent regard client/server computing as "a buzzword of unclear meaning."

According to Richard Villars, an analyst with the Framingham, Mass.-based market research firm (which is owned by International Data Group, the publisher of *CIO*), the results are a sign that client/server computing "is rapidly being recognized as a model for new application and system planning and design." But Villars views the figures as an indicator of successful marketing tactics, rather than actual implementation. "No vendor can currently deliver an integrated set of services and products that enables customers to make client/server a reality for more than a limited set of applications and systems," he wrote. According to Villars, the study measures whether customers think they are moving toward a client/server architecture, not the extent of their commitment.

The survey also found that Unix and MAX/EMS sites were more likely to claim they are moving to the client/server model, while IBM 370 sites were more likely to be planning to make this move. Insurers and wholesalers were most skeptical, while service firms were most enthusiastic.

The June 1991 report is based on 1,850 completed telephone interviews with information processing sites. ■

TRENDLINES

ON THE SUBJECT OF OBJECT

CIOs, software engineers and technical managers fascinated by C++ and related matters may have a new object of their affections.

Object Magazine, which is published six times per year, focuses on how organizations can gain a competitive edge by using object-oriented techniques. *Object* covers language advances, database breakthroughs, standardization efforts and templates for organizational restructuring. It also includes what the magazine calls "real-world tutorials"—critical analyses of the step-by-step implementation of large projects.

Regular columns will focus on such subjects as analysis and design techniques and object-oriented project management. Also included are case studies from banking, financial and insurance institutions that are successfully using object technology.

For subscription information write to *Object Magazine* at 588 Broadway, Suite 604, New York, N.Y. 10012, or call 212 274-0640. ■

INTERFACE DESIGN

THE ART OF VINCENT VAN GUI

Software developers have long prided themselves on being artists. Now some artists are becoming software developers as IS organizations in the process of developing systems with graphical user interfaces hire graphic designers to help design the screens.

Aetna, the Hartford, Conn., insurance giant, has hired

graphical designers to help develop a GUI for an employee communications system, according to Terri G. Ducay, a senior design planner working on the project. Jim Gralow, manager of energy-management information systems at

Pacific Power & Light, in Portland, Ore., brought in Aaron Marcus and Associates, a "computer-based visual-communication" consulting firm based in Emeryville, Calif., to help conceptualize the GUI for a relational database system.

These companies are following in the footsteps of computer and information service vendors, such as Apple, Scitex, ASK Computer Systems and Reuters, which have employed industrial and graphic designers to create user interfaces.

What motivates techies to hire artists? Good visuals make systems easier to learn and use. Because it takes users less time to understand the screen it also takes them less time to find the information they need: That cuts down on the amount of time and money spent on training, according to Jeffrey G. Bonar, chairman of Guidance Technologies, a Pittsburgh GUI-development toolmaker.

And software tools cannot take the place of designers. "Window-management systems like Motif or OPEN LOOK do not provide enough guidance on how to design icons, dialogue paths and boxes," said Marcus.

But not every Vince, Claude and Leonardo has the ability to design GUIs. The trick is finding artists who can reach beyond graphic design into "information design," according to Ducay. The computer screen, after all, is interactive; it's dynamic; it's complex," said Bill Verplank, a consultant at IDEO, an industrial-design firm in Palo Alto, Calif. Still, it may be only a matter of time until crowds line up at the Metropolitan to see "Whistler's Modem." ■

AN AYE FOR AN EYE

Switching to paperlike, high-resolution VDT displays could improve worker productivity by more than 17 percent, according to a recent study by the University of California at Berkeley's VDT Eye Clinic. For an employee who spends half his or her time working in front of a monitor, that



translates to 285 lost hours per year.

The study, funded by VDT-maker Cornerstone Technology of San Jose, Calif., was conducted by James Sheedy, associate clinical professor at UC's School of Optometry and director of the eye clinic. He compared IBM Video Graphics Array displays (resolution of 640 by 480 pixels) with Cornerstone's Dualpage monitor (1,600 by 1,280 pixels). To isolate resolution as the determining productivity factor, Sheedy made allowances to minimize differences in screen size, character size and scrolling techniques.

Not only were subjects able to read and comprehend more lines on the paperlike display, they experienced fewer discomfort symptoms such as headache, blurred vision and burning eyes. ■



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TELECOMMUNICATIONS

THE HIGH PRICE OF KEEPING UP

The word "change" is essential to any description of the current state of telecommunications. "Small change," however, is not.

The average Fortune 500 company spends nearly \$1 million a year on personnel just to keep pace with changes in telecommunications, according to a survey by Verilink Corp., a manufacturer of T1 telecommunications access-management products. Nearly half of the telecommunications staff at most major corporations is dedicated to dealing with developments in technologies, standards and network uses, the report concluded.

Network managers who responded to the survey estimated that improved methods to quickly implement changes could save their organizations an average of 24.5 percent of network operating costs. For example, more than 70 percent indicated that they would field-test new services and applications if vendors reduced the time, risk and expense of doing so.

Despite the high price of change, survey participants said the benefits far outweigh the cost considerations. More than 63 percent of respondents said they are involved in three or more projects driven by non-routine activities and suggested that such projects were more likely to increase company revenues than ordinary operational tasks. (Non-routine activities were characterized by new equipment or switch installations and advanced applications.) Seventy-eight percent said that planning, creating and implementing new applications was an important change-related activity; 66 percent mentioned planning for growth, and 59

percent talked about assessing new technology options.

Looking to the future, almost 90 percent of respondents believed that new uses of the network will continue to be the most important source of change. Specifically they expected the impact of emerging standards and technologies such as frame relay and SMDS to double in importance.

As one respondent noted, "With companies increasingly depending on networks to carry information that's critical to daily operations and revenues, we can't afford not to make refinements." ■

ELECTRONIC SOFTWARE TRANSFER

One thing readers said they wanted from vendors when we surveyed them for our special March software issue was the ability to receive software licenses electronically. Softmart Inc., an Exton, Pa.-based supplier of software, networks and peripherals, has inaugurated a service that meets this need. Softmart makes available electronically more than 1,200 products from a variety of vendors. Among those participating in the initial stages of the electronic delivery service are Borland International (and Ashton-Tate), Central Point Software, Lotus Development Corp., Microsoft, Software Publishing Corp. and Micrografx Inc.

Benefits from this sort of arrangement accrue to purchasers and vendors alike. User registration rates, which range between 5 and 20 percent for traditional distribution methods, approach 100 percent with electronic delivery. This enables user companies to streamline purchasing, administer the installed base more effectively, take advantage of discounted upgrades and control illegal copying. Vendors enjoy mirror benefits—low-cost distribution, reduced piracy and a clearer profile of their customer base.

At present, 13.2 percent of Softmart's orders are taken electronically; the firm expects that to grow to 25 percent by year's end. ■

VIRTUAL REALITY IS ITS OWN REWARD

Successful research into creating virtual-reality systems may hinge on ventures such as those underway at the Human Interface Technology Laboratory in Seattle. The HIT Lab—which is part of the state-created Washington Technology Center—is devoted to fostering a flourishing virtual-interface industry in the state. Its efforts are partially funded by the Virtual Worlds Consortium, consisting of a dozen enterprises (among them Boeing, Digital Equipment Corp., Fujitsu, Microsoft, The Port of Seattle, Sun Microsystems and US West) each of which invests at least \$50,000 annually in the lab's research.

Virtual reality essentially dissolves the boundary between user and computer so that the user has a sense of being "inside" the computer and can interact with it directly using voice commands or hand gestures.

According to HIT Lab Director Thomas A. Furness III, Virtual Worlds Consortium members "will be intimately involved with us in bringing virtual-worlds technology to a market hungry for applications in medicine, design and manufacturing, education and



entertainment."

As one of the benefits of sponsorship, consortium members get first crack at the fruits of the HIT Lab's R&D. The lab is about to file its first three patent applications, to which members have first rights of review. ■

ILLUSTRATION BY FRAN O'NEILL

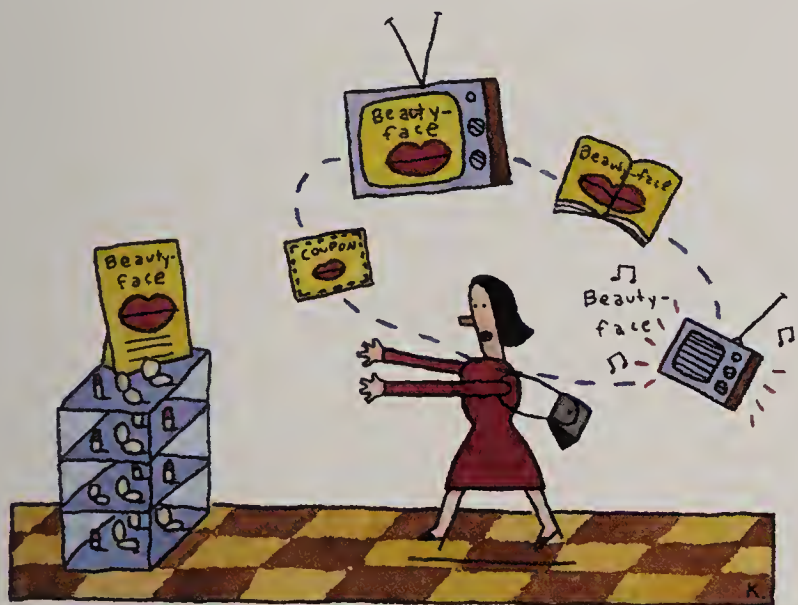
TRENDLINES

MARKET RESEARCH

THE MAKEUP OF MAKEUP SALES

Does the buying public still believe that blondes have more fun? Inquiring drug-store owners want to know.

Manufacturers will receive weekly reports of scanned data, as well as the tools with which to drill down into specific channels, chains or stores.



In a move that will help manufacturers and retailers of health and beauty aids target consumers the way the apparel industry does, Nielsen Marketing Research USA of Northbrook, Ill., has introduced Procision, a scanning-based, integrated information service. Procision integrates weekly sales data with causal information such as feature advertising and in-store displays. It breaks new ground in the health- and beauty-aid industry by weighing marketing-plan elements such as television-advertising viewing data and coupon distribution.

Store-level data will be augmented by Nielsen's own household-purchase behavior panel covering all trade channels. By integrating these components into a single information source and supporting them with business applications, the company believes it will help store managers and manufacturers make better decisions. Stores and manu-

The basic Procision will serve four retail channels: food stores with revenues of over \$2 million, food and drug combinations, drug stores with revenues of over \$1 million and mass merchandisers. Nielsen has signed over 400 drug stores, 300 mass merchandisers, 2,700 food stores and 330 food/drug stores, including most of the major retailers in the various channels. Participants in the service include Wal-Mart, K mart, Rite-Aid, Walgreens, A&P, Ralphs and Vons. Nielsen has been delivering basic data since April for mass merchandisers and since May for drug stores. More detailed and specific reports will become available in late 1991.

"It has taken some time to bring Procision to market because it's a truly integrated service," said Richard Derr, Nielsen's vice president of industry management. "It's the next generation of scanning services."

FUZZ FACTORS

Fuzzy priorities cloud the future of fuzzy-systems development in the United States, according to Lofti Zadeh, the reputed creator of fuzzy logic and a professor at the University of California at Berkeley. But the U.S. development effort could get an overdue nudge from a project announced by the Microelectronics and Computer Technology Corp. (MCC) at a conference it sponsored on fuzzy systems in Austin, Texas, in June.

(For the uninitiated, fuzzy-logic-based systems use sets of fuzzy rules that attempt to simulate human decision making—particularly the human ability to reconcile imprecision and ambiguity. A fuzzy system can process relative terminologies such as "slowly" or "a little more." Commercialization of fuzzy systems—especially in industrial- and appliance-control applications—is considerably farther along in Japan than in the United States and Europe.)

Zadeh, who spoke at the conference attended by representatives of corporate and academic research organizations, blamed the "deeper entrenchment of more traditional approaches" to control systems in Western societies than in Japan. "[I]t becomes difficult to take something that is in wide use and replace it with something else," Zadeh said.

In the hope of spurring progress toward wider commercialization of fuzzy systems, MCC's project is intended to result in a standard, open architecture in which such systems would execute. A standard architecture "would allow for more rapid implementation of fuzzy systems in this country," said Ron Riedesel, director of MCC's Advanced Computing Technology Program. The project, which will involve both leading commercial developers (mostly Japanese) and research organizations, is expected to launch in early 1992.

ON THE RECORD

The U.S. judicial system seems finally to have lost patience with the victims of workplace discrimination. According to a recent *New York Times* article, civil rights that are well established in law turn out to be practically unenforceable. Because the effect of recent Supreme Court decisions has been to make discrimination lawsuits increasingly difficult to bring, costly to prosecute and—perhaps worst of all—financially unrewarding even when plaintiffs prevail, lawyers in growing numbers are turning away cases. The *Times* reported that a study by the National Employment Lawyers Association showed 44 percent of the group's roughly 1,000 members rejected more than 90 percent of such cases brought to them by clients. As a result, many plaintiffs either forget about it and go looking for another job or else try to represent themselves. "They're getting killed in court," the *Times* quoted a Dallas civil-rights lawyer as saying. "It's like sheep to the slaughter."



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THE POWER IS ON

The Voice of the User

Faced with smarter users and more threatening competitors, IS needs a crash course in marketing if it hopes to survive

BY RICK ONO

In the past, the internal IS organization held the keys to the information kingdom. When a departmental user needed a new spreadsheet or word processor, it was IS that would determine what application to employ and when and how to implement it. With the proliferation of PCs, however, users have become more knowledgeable. And a little knowledge can be a dangerous thing—dangerous, that is, for the career IS manager.

As departmental users become increasingly computer literate, their demands become more specific. When IS cannot deliver on these demands, the users look elsewhere, and outside sources for IS services pose a competitive threat to the internal organization. This is evidenced by the growth of departmental PC networks, many of which are installed by value-added resellers (VARs) without any involvement from internal IS. In order for IS to grow,

or even survive in the face of external competition, it must apply basic marketing techniques.

There is no black art to marketing. Developing an effective marketing strategy requires common sense, a working knowledge of the technology and the ability to listen with an open mind. Where most IS departments run into trouble is at the implementation stage. In order to overcome that hurdle, they need a clear understanding of customer needs, the competition and methods of developing a marketable service.

Know Thy Customer

Understanding customer needs is essential for anyone developing a product or service; the best way to do that is to listen to the customer. Not listening is the worst mistake a marketing professional can make. Unfortunately, some people have selective hearing.

Take the case of a departmental user at a large health-care organization who needed access to a database on the mainframe. Initially, he asked IS to set him up with a virtual drive on the mainframe to allow access from the LAN. However, response time was extremely slow, because the transmission line was not upgraded to a higher-speed line that could handle the increased traffic. As a consequence, the user decided to do without the client/server application and reverted back to terminal emulation. Had the application been implemented properly, the response that the user's department could have provided to its customers would have improved dramatically. Unfortunately, the IS manager did not see it that way. "I knew that all they really needed to do was terminal emulation. I just gave them the virtual drive to prove it to them."

One way many IS organizations



ILLUSTRATION BY JIM CARSON

identify customer needs is through surveys. While these questionnaires can provide useful information, the danger exists that the person analyzing the data may be tempted to read into it what he or she wants to believe. It is also difficult to get all the necessary qualitative information.

Another disadvantage of surveys is that they don't always ask the right questions. In the 1970s, for example, U.S. automakers tried to identify their customers' needs by asking what features they preferred on full-sized sedans, rather than trying to understand why so many people were buying VWs. IS steering committees composed of departmental managers can be an effective way to exchange data. Observing customers' work habits firsthand and analyzing their business processes can also provide invaluable information.

A non-customer-focused solution, on the other hand, can backfire. At a manufacturer of printer circuit boards, IS decisions were never challenged until the company acquired a smaller business that focused most of its computing power in PC LANs distributed throughout the departments. Several managers in the parent company were impressed by how quickly their counterparts in the acquired company were able to access information, and they asked IS for a similar solution. But IS shot down every request for PCs and PC-based networks on the grounds that they would create chaos and that centralized control of information was the only way to maintain order. The departmental managers went ahead and purchased the PCs and LANs with their own operating budgets and began to hold PC training classes without the participation of IS. The LANs were purchased from resellers who designed, installed and maintained them. Several bloody fights ensued as IS attempted to block the purchase, creating considerable resentment between the combatants.

"[IS is] so out of touch with our needs," said one manager. "They are just trying to protect their power base and by doing so they are hurting the effectiveness of the company. What they don't understand is that

our customers need us to be more responsive. This means that information has to be readily accessible."

Know Thy Competition

To win in a competitive environment it is also important to know the competition. In the IS services market, knowledge of competing technologies and price structures is imperative. The accounting department of a major engineering firm requested an applications package that would allow accountants to window between a spreadsheet and word processor. IS proposed a mainframe-based solution

In the IS services market, knowledge of competing technologies and price structures is imperative.

that would cost the department approximately \$30,000 and take three months to implement. The accounting department manager was also approached by a VAR who proposed a PC-based solution that cost \$15,000 and could be implemented in two weeks. "You didn't need to be a rocket scientist to figure out which option to take," the manager said.

One way to understand the competition is to manage it. The IS organization mentioned above could have hired the VAR to gain a better understanding of how it does business. Just by putting out a competitive bid, IS can learn much. Another way to get information is to talk to the competition's customers. Some useful questions to ask: Why did you choose this company? What did they do right? What did they do wrong? Would you hire them again?

Develop a Marketable Service

IS must develop services based on customer needs and requirements, not its own agenda. These services must be competitive in price, technology and flexibility; otherwise, us-

ers will look elsewhere. Once IS loses a department to the competition, the door is open that allows the competition into other departments. Trying to block the use of outside services and forcing a solution on the customer will only create an adversarial relationship. IS must think and act like a market-driven organization.

The first priority of a market-driven organization is to determine a focus. Many companies try to be all things to all people, but the key to success for organizations with limited resources is to concentrate on what they do best. For example, it may make sense for an IS organization to outsource the network infrastructure so its people can focus on more strategic issues such as application development or managing the computing platforms. By focusing resources and closely managing alliance partners (outside service providers), IS will be in a better position to develop a competitive advantage.

One technique many companies use to develop marketable products is the "whole product analysis" approach used by management guru Tom Peters. Whole product analysis differentiates between the technologist's view of the product, which places a high priority on features and benefits (generic tangibles), and the customer's view, which places a higher priority on the services and perceptions that surround the product (intangibles).

In this scheme, IS should focus on intangibles: how users perceive its responsiveness and ability to deliver services. The IS manager must find out firsthand the departments' needs—beyond the features and benefits of the technology—and constantly provide those services.

All service-oriented companies must constantly prove the value of the intangible service. It is easy for customers to forget what they can't see or touch. By employing some of these basic marketing techniques, IS can continue to be a valuable asset to the company. ☐

Rick Ono is a principal at Regis McKenna Inc., a marketing consulting firm located in Costa Mesa, Calif.

A Wise Consistency

How one Fortune 500 company cut costs, controlled inventory and reduced platforms through standardization

BY TOM KELLY

The more things change, the more essential it is that some things remain the same. This is particularly true in the area of hardware and software acquisition. Faced with a rapidly expanding computer technology market, companies can find themselves dealing with a costly and confusing proliferation of products purchased for the same or similar functions. For these companies, standardization may be the answer.

Standardization has been shown to reduce the purchase price of hardware and software; simplify and reduce costs for training, maintenance and interfacing; and increase productivity. Despite these benefits, only about 25 percent of Fortune 500 companies currently have standards in place to guide the purchase of hardware and software.

Grumman Data Systems, an aerospace and electronics defense contractor located in Bethpage, N.Y., is one example of a company on which standardization has had a strong positive impact. Grumman formally introduced standardization in 1987 in re-

sponse to the company's need to manage its growing networks, control costs and check expanding corporate product inventory.

The previous year Grumman had reconfigured its corporate structure into 10 divisions, each organized around a major product or service. At the time there was concern—well-founded, it turned out—that the new divisions might become “islands of automation.” Under this new autonomous structure, each division developed its own unofficial lists of approved PCs, and by 1987 the corporate inventory contained 30 PC brands. As a result of this proliferation, Grumman's information resource management (IRM) organization found it increasingly difficult to informally monitor and approve new purchases throughout the company.

IRM's search for a more effective process led to the formation of a standards committee that serves all 10 divisions. The committee has standardized on approximately 1,300 products and has kept this number constant—every year about 50 products are added and about the same number are removed from the list. For example, Grumman has reduced the number of PC brands it uses from 30 to six.

The process has long-term implications as well. Having fewer platforms simplifies the large-scale interfacing issues that challenge the company as it moves toward its goal of becoming a computer-integrated enterprise (CIE).

Grumman's standards committee comprises some 90 representatives from the various divisions. The committee establishes standards, notifies the corporation of those standards twice a year and approves or vetoes products.

The committee is made up of eight



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subcommittees, one of which fills an administrative function. The remaining seven handle product evaluation and standardization for one of the following: microcomputer hardware and software (including a wide range of peripherals), minicomputers and peripherals, mainframe and mini software (including languages, operating systems and network security), communications, secure systems, data resource management, and outside services such as dial-up online databases. In total, the subcommittees oversee 34 categories of hardware, 13 categories of software and four categories of functions.

The standards committee accepts requests for new products and their evaluation from users, user groups, corporate and division management, and its own members. If the product requested is for a specialized application that might be important for a single user, that user may be assigned the task of evaluation.

When the request is more broadly based, the committee undertakes the evaluation itself, beginning with a review of product literature. Committee members investigate the product's capabilities, compatibility with existing Grumman products, software configuration and price.

If a product request passes an initial assessment, including a check against the standards database to see if it has been evaluated in the past, a sample is purchased. The sample is tested by the person or group that requested it in an operational environment for one to six months. A PC, for example, is tested with several standard application packages, hardware boards and peripherals, as well as with multiple mainframes, EIS systems, spreadsheets and word-processing packages. It is also tested with several types of networks of varying sizes. Information gleaned from these evaluations is entered into the database and is available online to Grumman users.

If the product fails at any point, the evaluation is abruptly ended. A token ring interface board, for example, failed when more than 20 terminals were connected to a LAN. This failure was conveyed to the vendor, who reassessed the product.

If the product proves successful, it is either approved and incorporated into the standards list for corporate use or accepted for a particular application, depending on the nature of the original request.

The committee also reevaluates

Grumman strives to maintain a balance between its existing standards and fast-moving computer technology.

existing product standards to reduce the number of types in use, where possible. This leads to eventual de-standardization of products and their elimination by attrition or trade-in for new equipment.

The committee records newly approved products and products that are no longer approved in the Grumman standards list, which is distributed twice a year to managers in all 10 divisions, as well as to all purchasing departments. Interim draft lists are also published to avoid delays in acquisition and to permit timely dissemination of information on new products.

Every purchase of hardware and software requires a requisition order containing an official standards committee stamp, without which it cannot be processed. To expedite the procurement process, every division has a designated person who can stamp standard purchases without having to go back to the standards committee.

Grumman strives to maintain a balance between its existing standards and fast-moving computer technology. The standards cannot be too limited, because that would impede the acquisition of new technology. On the other hand, they cannot be too broad, because that would result in autonomous environments and would tend to limit—if not cancel out—the

benefits of standardization.

Grumman has found that standardization directly affects levels of cost, training, maintenance, parts inventory and productivity, all in direct proportion to the number of vendor products used. Consider:

- Limiting vendor product types allows purchasing in quantity. Instead of buying 10 microcomputers from each of three different vendors, for example, the company can buy 30 from one vendor at a better price.

- Maintenance for fewer types of products costs less, and so does the smaller variety of parts kept on hand for repair. Maintenance also takes less time on familiar equipment.

- By providing hardware and software recommendations that have proven capabilities and interoperability, standards lift the burden of product research from the user.

- Training a new or reassigned employee on a familiar system takes far less time than on a system unfamiliar to the employee. And employees are far more likely to be able to master a narrow range of systems and be productive on them consistently and effectively.

- Connecting fewer familiar systems into a network is comparatively simple because there are fewer interfaces and they are all well established. New code or special hardware is not needed.

- Should departments (or even divisions) merge, as sometimes happens, incompatible vendor types can prohibit interconnectivity, while compatibility has the opposite, positive effect. The same holds true when the time comes to connect smaller networks into larger ones—an ongoing process at Grumman and many other corporations these days—and when international standards must be applied to networks.

Overall, standardization has functioned as an invaluable control on wasteful proliferation and system life-cycle costs. The effort that Grumman has expended is far smaller than the benefits received. □□

Tom Kelly is vice president of information resource management at Grumman Data Systems, in Bethpage, N.Y.

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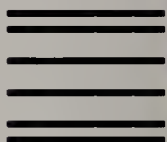
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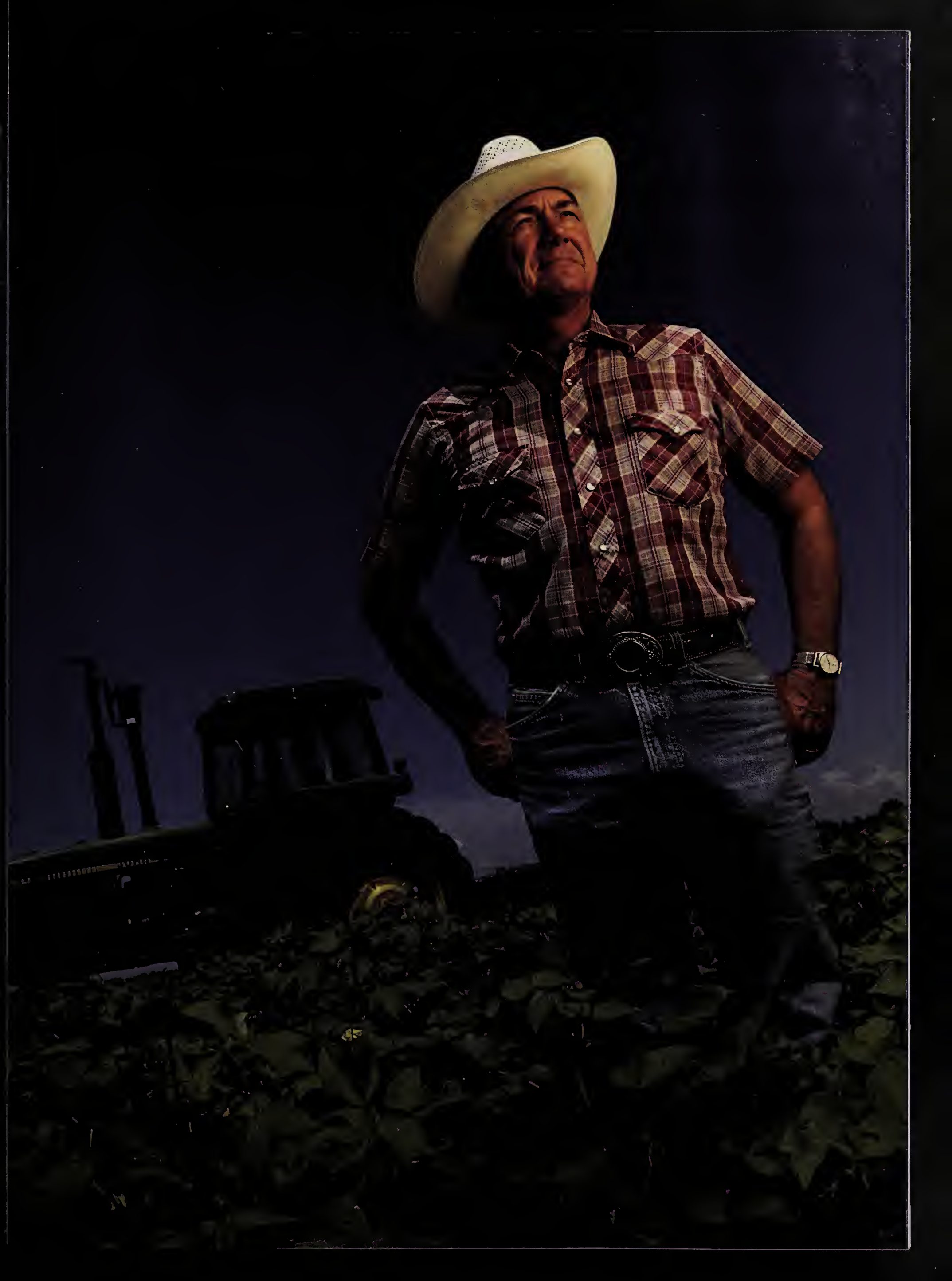
JACKIE MULL and other
PCCA officials saw that the
road to economic gain lay in
bringing together greater
numbers of buyers and sellers.

After centuries of
one-on-one
haggling, cotton
growers and
cotton merchants
are finding it
advantageous to
get together on a
trading network
and bargain
electronically

THE COTTON CLUB

At first glance, Dunavant Mask and Jackie Mull are unlikely partners in the information revolution. Mask, a Memphis, Tenn.-based cotton merchant, and Mull, a cotton grower in Idalou, Texas, pursue vocations that have always been economic opponents since the industry's inception. Their commercial conflict might continue today were it not for the advanced distributed computing network known as Telcot.

BY PAUL KONSTADT





DUNAVANT MASK: "My profit per bale is down, but I also have the power to handle a larger volume. That's a good economic structure."

"[The network] makes it easier to market our cotton, [and] I feel a lot better about the prices I'm getting," said Mull.

Traditional adversaries like Mull and Mask need no longer eye each other suspiciously through the dust of a cotton gin at harvest time, struggling to establish a mutually satisfactory deal. Telcot automates all aspects of cotton trading, from the matching of buyers and sellers to the transfer of funds and titles. As a result, it has changed the outcome of the farmer-merchant business contest from win-lose to win-win. "The farmer gets a better price, and I'm

With Telcot, an automated trading network, "the farmer gets a better price, and I'm able to trade more volume and cut costs."

—Dunavant Mask



able to trade more volume [and] cut costs," Mask said. "This is the way of the future."

The system gives each of the industry's constituent groups singular business benefits. Telcot's continual electronic auctions provide farmers with visible and disinterested price setting. Telcot's bale-by-bale listing of price, bale purity and fiber quality gives merchants an exact inventory of cotton available for sale and a mechanism for buying it as rapidly as market needs dictate. Telcot's transaction processing and vast fund of readily accessible sales information have utterly transformed the roles of the cotton-gin clerks.

Gins are more than just places where freshly harvested cotton is purified and packaged into bales: They serve as the administrative centers for cotton growers. Gin clerks maintain individual farmers' warehouse inventory records; they process sales to merchants, and they monitor markets. As the operators of the Telcot terminals, they are also the contact point between the farmers and the network.

By speeding transaction processing, automating record keeping and providing coherently organized up-to-the-minute sales data, Telcot has transfigured gin clerks from overburdened paper handlers into potent knowledge workers. They now have the ability to guard farmers' commercial interests and the tools to respond to changing market conditions.

"Our time is spent much more wisely now," said Jody Foreman, office manager at the gin in Idalou for the past 13 years. "We're here to get the farmer every dollar we possibly can for his cotton."

Telcot has had a similar impact on the role of the merchant. Those who use it say it allows them to focus more on performing functions that add value—tasks such as reshuffling growers' jumbled lots of varied grades of cotton into homogeneous production-run-sized batches that will feed the textile mills' automated machinery, and finding buyers for odd bales of cotton that have undesirable or unusual traits.

"When a mill buys directly from a grower, [it] can maybe only use 80 percent of the lot, and [has] to resell the other 20 percent, probably at a loss," Mask explained. "My business is taking on that risk [and] finding buyers. . . . Telcot gives me more time to [do it]."

Obtaining higher and more uniform prices for cotton growers was the original intent of the creators of Telcot—the Plains Cotton Cooperative Association, of Lubbock, Texas, of which Jackie Mull is chairman of the board. To achieve that goal, PCCA, a group of small and mid-sized cotton growers in West Texas and Oklahoma, had to re-engineer much of the process by which farmers and merchants did business, and do it in a way that was attractive to both groups so that all would accede to the new system.

Under the market structure that existed when growers banded together to form the PCCA in 1953, there were a limited number of selling choices. Growers could strike deals with one of the handful of itinerant merchants who came to the gins at harvest time or sell by telephone to distant traders based in Dallas, Memphis and other mercantile centers. As a result, prices tended to be low on average, and they varied widely from transaction to

transaction. The co-op's efforts to do better for its members within the traditional marketing framework proved to be ineffectual, and by the early 1970s, most PCCA members were again simply going it alone rather than trying to sell collectively.

PCCA officials realized that to gain real economic improvement, they would need to change the market's dynamics and bring together greater numbers of buyers and sellers at once. They turned to IT, using as a conceptual model the electronic monitors that display airline arrivals and departures.

Their first information service was a straightforward electronic auction whereby the farmer chose a moment to sell, the electronic gavel fell 15 minutes later, and the highest bid entered into the system won the lot. Procedures for more complex transactions soon followed, and now most growers sell their cotton by posting

open-ended selling proposals in a special Telcot queue. A buyer can execute a trade at the offering price at any time, or try to renegotiate by exchanging messages over the network. Growers who want to hedge against production risks can sell acreage contracts in advance of the harvest; such contracts are agreements



ECONOMIC HARVEST:

Growing cotton was a low-paying, unpredictable pursuit until the Telcot automated-trading system made the crop easier, and more profitable, to market.

PHOTOS BY JOHN JOHNSON

to deliver the entire output of a given cotton field as a whole for a previously agreed-upon price.

Telcot's first application was brought up in 1975. "It was an exciting time," recalled Darryl Lindsey, vice president of operations for the PCCA and one of the architects of the system. Nothing like Telcot had been tried before, he said, so it was a stressful and chaotic time as well. "We were debugging and testing programs on the fly in production, and testing out new hardware too."

In terms of growers' income, the effort has by most accounts proven to be worthwhile. "I don't think there is any question at all but that we have improved the price level to the farmer," said Lindsey.

The flip side of that, of course, is that the merchants end up paying more. But while Mask acknowledges that his profit margin is squeezed by the relatively higher prices, he ar-

gues that his ability to make more money overall is augmented by the system. "My profit per bale is down, but I also have the power to handle a larger volume," he said. "That's a good economic structure."

Along with that potential for economies of scale, merchants get a significantly lowered structural cost of doing business. Under the old manual system of buying cotton, Mask said, it might have taken as long as two weeks to assemble the stock to fill a 10,000-bale order. With

Telcot, a merchant can do the same work in an afternoon, saving storage charges and interest expense on working capital—inventory holding costs that average 75 cents to \$1 per week per bale. "We deal in large volumes and small profit margins," Mask said. "Saving a dollar or two per bale is a big difference to us."

The degree to which electronic trading has changed the industry and boosted growers' income was highlighted on Feb. 21, 1989. The Chinese government had just placed an

TECHNICAL PROFILE

The Plains Cotton Cooperative Association (PCCA), a group of small and midsized West Texas and Oklahoma cotton growers headquartered in Lubbock, Texas, created the Telcot distributed trading network to improve the process of buying and selling its members' cotton crops.

Telcot is built around an IBM 3090-200E running ESA. The system supports approximately 120 terminals, mostly in PCCA offices, and 165 networked IBM PS/2s. Eight disk drives supply 65 gigabytes of online storage; mass storage is provided by four cartridge transports. The network runs 40 9,600-baud and five 19,200-baud telecom lines. Telcot is supported by 16 applications and four systems-programming staff.

Live from Lubbock!

Sending trading data over FM radio helps the PCCA avoid problems involved in using often-persnickety local phone lines

The Plains Cotton Cooperative Association (PCCA) is using advanced telecommunications technology to turn an operational nightmare into a strategic boon. It has replaced problematic telephone circuits with its own private radio network for the Telcot electronic trading system.

"These itty-bitty rural telephone coop-

eratives serve maybe 500 customers, [and] they don't comprehend data," said Darryl Lindsey, vice president of operations at the PCCA, a group of small and midsized cotton growers in West Texas and Oklahoma. "But they have the exclusive right to [many gins'] territory," he continued, so wherever the PCCA wanted to use a land line for a particular gin's data link, "we had to use their facilities to get to the gin."

FM data radio has freed the PCCA from that dependency. The co-op is now halfway along in a \$1 million program to scatter transceivers across West Texas and Oklahoma. Each of the 25 towers will blanket a 2,800-square-mile area and be linked directly to the PCCA data center in Lubbock, Texas, replacing the present 11,000-mile-long network of twisted-pair wires.

High-capacity radio

creates a number of tactical advantages for the PCCA according to Lindsey. Where the telephone circuits moved data at a relatively lethargic 2,400 characters per second, the radio network's data packets zip along at 9,600. That slashes system response time at the user's end from 10 seconds to three.

Under the old arrangement, telephone line charges averaged about \$60,000 per month; when the radio network is completed, the tab will be closer to \$15,000. The total radio investment should be recovered in less than four years, Lindsey estimated.

Those benefits may be important, but they are dwarfed in the PCCA's eyes by the power of FM radio to bring information service directly to isolated farmers. "FM radio provides a level of service that we've not had before," Lindsey said. "We can deliver data to a home—or to a mobile unit in a tractor or a pickup truck."

—P. Konstadt



order for a vast quantity of cotton with Memphis merchant Julian Hohenberg, who then turned to his Telcot terminal. Hohenberg called up what Telcot calls its Firm Offer queue, which lists all growers' good-until-canceled offers to sell. Farmers' lots usually contain anywhere from a handful of bales to a few hundred. Hohenberg needed hundreds of thousands of bales, so, beginning with the lowest-price lots on the queue, he started taking every lot available.

Since Telcot displays the results of trading activity as it occurs, Hohenberg's buying spree was quickly apparent to gin clerks, who routinely monitor the Firm Offer queue to spot trends in the market. As Foreman watched the breakneck pace of electronic dealing continue unabated, she started increasing the prices for those of her farmers' lots that had not yet been bought. As some of these were snapped up, she would again reprice what remained. Some farmers received as much as 2 cents per pound (\$10 a bale) more for their crops because Foreman and others like her had seen the temporary seller's market evolve on Telcot and used the system's powers to take advantage of it.

"It was the most exciting day of my life," Foreman recalled. "I did nothing all day but push buttons and watch the screen."

When the books were finally closed on that hectic day, Telcot had moved 385,599 bales of cotton, more than five times the typical volume for that time of year. The frenetic buying, selling, repricing and price checking created 250,696 separate data transactions, more than twice the normal volume.

That may have been a glorious peak for Telcot in terms of system volume, reliability and user credibility, but it was reached only after a long and arduous climb for the system's builders. "It was a bloody process, and we learned a lot of things the hard way," Lindsey acknowledged.

With its written-from-scratch software and experimental communications controller technology, Telcot crashed frequently in its first years and was often unavailable for any kind of service. Rather than try to man-

DARRYL LINDSEY: "I don't think there is any question at all but that we have improved the price level to the farmer."



PHOTO BY DAN BRYANT

Computer-Aided Cotton

IT helps lower-grade cotton make a place for itself in a pair of jeans

Information technology can make a silk purse out of a sow's ear. The Plains Cotton Cooperative Association (PCCA) proves the adage every day in a factory down in Littlefield, Texas, weaving acres and acres of the highest-quality denim fabric out of the lower-grade cotton typically grown on the harsh and dusty West Texas plains. The process may sound like alchemy, but it is an IT-driven transformation in which sophisticated, homegrown hardware and software gather and process the data that makes it all possible.



The first phase of the conversion is a computer-controlled analysis of each cotton bale. A system developed by the PCCA (a group of small and mid-sized cotton growers headquartered in Lubbock, Texas), precisely measures each bale's predominant fiber length, strength and density and the bale's overall purity. The system yields highly detailed information on each 500-pound bale that has proved to be of significant value to cotton buyers. It is also an absolutely vital foundation for the second phase of the Littlefield process—the careful mixing of mediocre with higher-grade fibers so that the blend performs like the premium cotton grown in wetter, gentler climates.

"We are using the data to select and blend the cotton . . . which creates added value for our farmers," said Darryl Lindsey, vice president of operations for the PCCA. "We'll take any textile mill in there and show them what we can do with West Texas cotton."

According to Lindsey, the bales are selected by a rule-based system that evaluates each bale's quality and performance test results. The rules embedded in the system were formulated by PCCA fiber researchers, who tested thousands of different combinations.

The Littlefield denim mill is more than just a demonstration of the value-adding abilities of information technology. It also provides 500 jobs in rural Littlefield, halfway between Lubbock and Clovis, N.M. The top-quality denim from the plant goes to a single buyer: Levi Strauss & Co. of San Francisco, which takes the cloth under a long-term contract. Littlefield is one of Levi's major suppliers.

—P. Konstadt

date particular improvements from the top, PCCA turned to the programmers, analysts and engineers who operated Telcot, giving them incentives to bolster system performance. The strategy was successful, Lindsey said. As a result, "today our availability is something like 99.8 percent during normal operating hours, [and] for the past five years, reliability has not even been an issue."

Winning the technical war was only one part of the development battle, however; gaining the hearts and

minds of the system's intended users was the other. There was no epiphany, just a gradual conversion as individual users satisfied themselves that Telcot was the better way.

"At first farmers didn't trust the numbers in Telcot, but they'd come in every day and keep checking," Foreman recalled. "I'd say it took them two or three years to feel comfortable with it." Whereas 15 years ago less than 20 percent of PCCA members' cotton was traded through the co-op, now more than 90 percent

of it sells via Telcot. The system handles a significant volume of non-member cotton today as well, and it essentially sets the price for the short-staple grade of cotton in the United States.

When Telcot first came online, only the most venturesome cotton merchants were willing to buy even

Many of the highest-volume cotton merchants and traders say they could not survive in the business without Telcot.



some of their cotton electronically. Now many of the highest-volume merchants and traders say they could not survive in the business without Telcot. George Clay, the Lubbock office manager for Dunavant Enterprises of Memphis (one of the country's largest cotton merchant companies, not connected with Dunavant Mask's business) has been trading cotton since 1947. "I wouldn't mind being younger," he mused, "but I wouldn't want to give up Telcot."

Like Mask, Clay embraced Telcot readily because he saw that the benefits of greater information clearly outweighed the penalty of more avid competition for farmers' attention. Other traders and merchants, however, refused to change the way they operated and were apparently pushed aside as a result.

"I remember one cotton buyer who cursed Telcot," recounted Mull. "He told me that it wasn't going to last; swore he'd never use it. I haven't seen him in a long time, and I don't know where he's buying his cotton now." 

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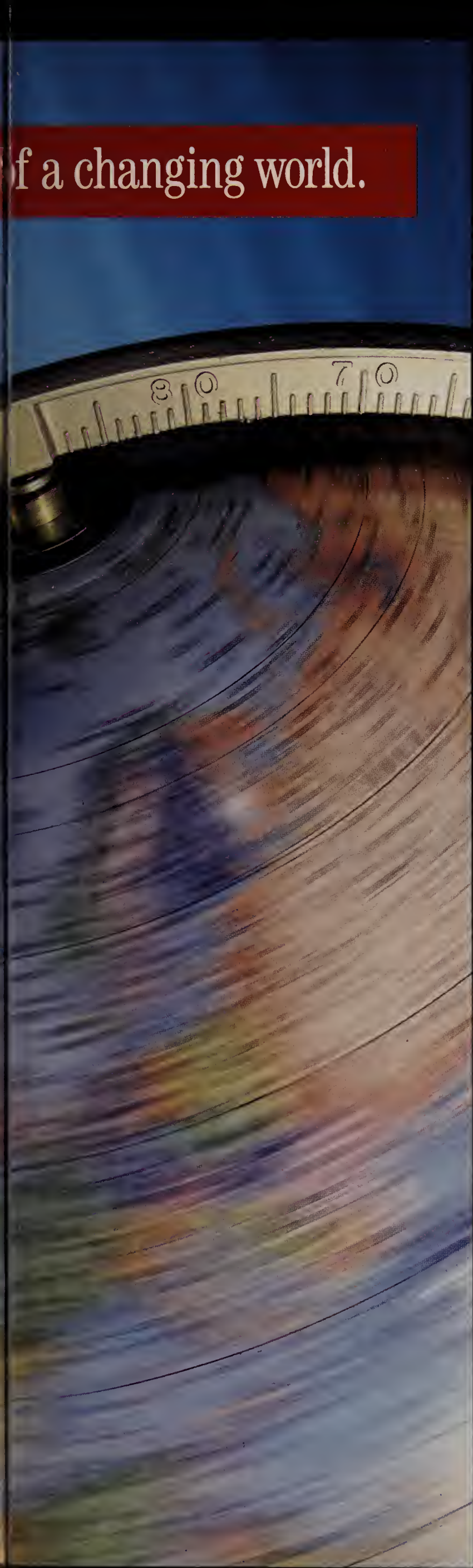
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OPEN SYSTEMS

The world of open systems poses so many baffling and perilous choices that CIOs might be tempted to study them all interminably, thereby succumbing to that handwringing torpor known as "analysis paralysis." Despite the considerable confusion, however, important opportunities await those who plunge ahead and 'just do it.' Our inaugural STRATEGIC OUTLOOK section explores some of the ways in which creative users, vendors and standards-setting bodies are advancing the goals of openness.

OPEN CITY

"What we really get from open systems is the opportunity to regain ownership of our data, which has been held hostage by proprietary, incompatible environments," said Bud Huber, chairman of the User Alliance for Open Systems. "We're not doing this just to make mediocre widgets five times faster and cheaper. We want to create some fundamental changes, and it takes open systems to do it."

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OPEN SEASON

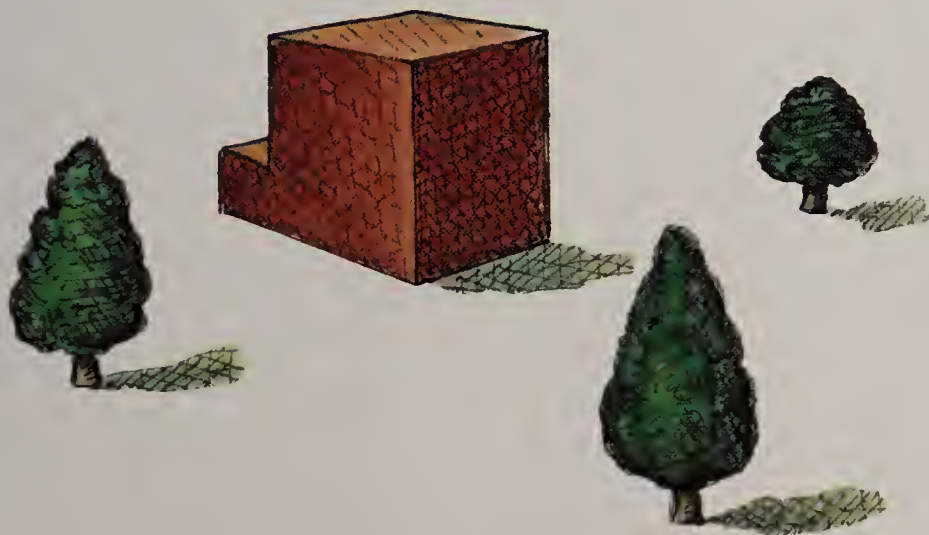
All the talk about the standards-setting process being gridlocked is just misguided, according to David Tory, who heads the Open Software Foundation. "If you look up close, you see bits of fur flying around, and it appears that we're in the center of a maelstrom. But step back a bit, and it's clear that we're in the middle of the same process of evolution and sorting out that always precedes the setting of standards—whether it's for cars or VCRs."

PAGE 56

OPEN ROAD

DHL Worldwide Express was an early Unix partisan, and, said MIS Vice President Michael Lanier, "We have the arrows to show for it." But hard-won experience in an immature Unix environment has given the courier firm a running start toward true open systems.

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OPEN SYSTEMS

OPEN CITY

It used to be safe and easy to buy proprietary solutions from a single vendor. But it was also a little like living in a monastery. Now that the world is pluralistic, dispersed and improvisational, freedom means controlling your own destiny.

BY DAVID FREEDMAN

The old saw about never getting fired for buying IBM sounds almost quaint these days. As conventional main-frame-dominated environments appear more and more burdensome in a world demanding flexible, closely linked systems from a variety of vendors, it seems inevitable that some CIOs will lose their jobs for having led their companies down the Big Blue (or any other proprietary) path.

But if the emergence of a new computing paradigm is potentially bad news for CIOs trapped in a single-vendor environment, it is also potentially good news for them, as well as for those who have ended up with a hodgepodge of incompatible systems from a range of vendors. After all, the new approach promises to be the path to deliverance from past sins. Simply switch to open systems—that is, to systems built around industry standards—and never again worry about being painted into a proprietary, incompatible corner.

There's just one catch: No one seems to be able to figure out what constitutes an industry standard. Is Unix a clear standard? If so, which of the competing versions of Unix takes the honors? Where does DOS fit in? Which networking schemes are likely to stay in the mainstream? There is growing fear that without straight answers to such questions, many organizations might be jumping from frying pan to fire.

Besides, even if the standards picture weren't fuzzy, the thought of somehow transforming today's lumbering, proprietary environments into tomorrow's nimble, open environments is





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OPEN SYSTEMS



DAVID TORY: "CIOS HAVE TO MANAGE HUGE, COMPLEX ENVIRONMENTS BY COMBINING THE BEST SOLUTIONS FROM A NUMBER OF VENDORS."

enough to make some CIOs miss the days when it was fashionable to be locked into a limited range of solutions. "MIS directors used to have a really close, comfortable relationship with a particular vendor that freed them from having to make any difficult decisions," asserted David Tory, president and CEO of the Open Software Foundation in Cambridge, Mass., one of the leading industry-standards groups. "That's gone now. Instead, CIOs have to manage huge, complex environments by combining the best solutions offered from a number of vendors. They are concerned and confused." (See related story, Page 56.)

But beyond the confusion lies a key oppor-

"WHAT WE REALLY get from open systems is the opportunity to regain ownership of our data, which has been held hostage by proprietary, incompatible environments."

—Bud Huber

tunity, according to Bud Huber, chairman of the User Alliance for Open Systems. "Most people focus on the cost benefits of vendor independence," he said. "It's nice to have those benefits, but it's not the important issue. What we really get from open systems is the opportunity to regain ownership of our data, which has been held hostage by proprietary, incompatible environments."

Huber speaks from firsthand experience. In addition to his work with the Alliance, he is senior information systems consultant at Hughes Aircraft Co., where he has been working on designing a new networked, distributed architecture based on open systems—which Huber defines as systems that

can be purchased from a vendor without having to worry about compatibility. "This new architecture will help us achieve capabilities like concurrent engineering, manufacturing to order and a reduction of product cycle time from 36 months to as little as 18 months," he said.

"I get goose pimples thinking about it. We're not doing this just to make mediocre widgets five times faster and cheaper. We want to create some fundamental changes, and it takes open systems to do it."

Not everyone intends to build a new architecture around the availability of open systems. American Airlines hasn't bothered—primarily because American's architecture was designed from the beginning to accommodate interoperability standards.

"We've always operated a complex, diverse network," said Steve Curd, manager of information systems integration in American's Sabre Computer Services Division. "We used to construct solutions to business problems from multiple proprietary technologies, making it all work together by developing our own internal open-systems standards. Now that the industry is adopting standards, we're simply incorporating them into our existing architecture."

Because of the flexibility of its architecture, American hasn't had to waste any time in taking advantage of client/server technology to move sophisticated processing functions closer to the user. The company recently introduced a new service, for example, that displays full-color, high-resolution images of hotel rooms on a travel agent's reservation screen; the textual and reservation data come from Sabre's mainframes, while the images are slipped in by a workstation in the travel agent's office. "We don't have to change our architecture to add these sorts of applications," said Curd. "We're just augmenting the architecture to incorporate emerging technologies, especially those that meet business requirements like improving customer service."

You don't have to be a Hughes Aircraft or American Airlines to reap benefits from an open-systems platform. When Four Seasons Hotel Limited determined in 1986 that it was time to upgrade the aging minicomputers at its 23 locations, the company decided to make the break from proprietary environments. "We wanted all the usual benefits, like scalability, portability, networking and investment protection," said Technology and Research Manager Geoffrey McDowell.

**"WHEN YOU MOVE
to open systems
. . . the cost base
shifts from paying
more to a supplier
to taking on more
costs in-house."**

—Geoffrey McDowell

But the company didn't simply swap mini-computers running a proprietary operating system for Unix minis; McDowell helped rethink the organization's architecture and oversaw a conversion to networked PCs with workstation servers in each hotel, all tied to corporate headquarters. "Now in most of our hotels any manager can tap into the system and find out about any aspect of the business," said McDowell. "That makes them better equipped to serve customers, which is our highest priority."

McDowell noted that despite the undeniable advantages of moving to a Unix platform, there was a price to pay as well. For one thing, the company has had trouble finding off-the-shelf software packages that precisely meet its needs. "Most of the packages in our industry have been ported to Unix from proprietary operating systems,



**GEOFFREY MCDOWELL:
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MORE TO A SUPPLIER TO
TAKING ON MORE COSTS
IN-HOUSE."**

and don't take advantage of the databases, fourth generation languages and graphical user interfaces that Unix offers," said McDowell. "The Unix development environment is great, but we don't want to be in the software development and support business, because we don't have enough hotels to spread the cost over."

In addition the company had to acquire some expertise in configuring its new systems—expertise it had been used to relying on a single vendor to provide. "When you move to open systems and multiple vendors," said McDowell, "you become the systems integrator, putting together computers

OPEN SYSTEMS

X, Y and Z, with applications A, B and C, and network Q. You get a lot of benefits from it, but in a sense the cost base shifts from paying more to a supplier to taking on more costs in-house."

The need to acquire expertise is a critical issue in moving toward open systems, and one that is often overlooked in all the fuss over standards, according to Bill Bonin, director of open-systems development for Hewlett-Packard. "This is a classic change-management problem," he said. "When you're talking about migrating to open systems, you're talking about changing the company." The problem is at its worst, he noted, when an organization tries to move wholesale from a proprietary, conventional environment into an open environment loaded with all-new technology. "If you wanted to, you could throw in client/server architectures, fourth generation languages, object-oriented databases, graphical user interfaces and a lot of other new twists," said Bonin. "But how much new technology do you want to tackle at one time? It makes much more sense to try to limit each project to one new element. The important thing is

"IF YOU LET THE technology drive you, you end up spending a lot of money and doing a lot of foolish things."

—James Hull

that you're moving ahead, because waiting around for everything to become easy would be a mistake, too."

One company that felt it couldn't afford to wait another minute to start its conversion to open systems is NCR. When the company changed its strategy in the mid-1980s from selling mainframes and minicomputers based on proprietary operating systems to pushing microprocessor-based Unix machines, it found itself in the potentially embarrassing position of running in-house the kind of mainframe-oriented, proprietary environment it was trying to talk its customers out of. "It behooved us to get our IT approach more in sync with the company strategy," explained James Hull, vice president of corporate information systems and services.

But NCR wasn't prepared to toss out its old systems overnight. "Our ultimate goal was to move to a client/server, PC-oriented architecture, but we didn't want to make the conversion all at once," said Hull. "The fact is, our existing systems were serving a lot of useful business functions, and we didn't want to put our resources into messing with a lot of old Cobol code. If you let the technology drive you, you end up spending a lot of mon-

Embracing the Inevitable

Why CIOs should stop worrying and learn to love open systems

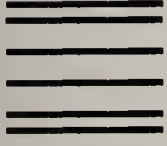
CIOs confused by the myriad choices involved in assembling and managing resources in multivendor, multiplatform environments have good reason to fret, according to Don Tapscott, vice president at consulting firm DMR Group Inc. in Toronto.

But while a lack of clear standards lies behind some of the confusion, he contended, there is a more fundamental problem underlying the angst over open systems: Most organizations lack a coherent, business-strategy-driven IT architecture into which open systems can be usefully incorporated. "What we've had is simply a conglomeration of systems individually designed to meet separate business requirements," Tapscott explained. "These environments can't deliver the capabilities demanded by an increasingly global, volatile and highly competitive business world. As a result, we're seeing an IT paradigm shift toward flexible, powerful, integrated architectures—and that's where open systems come in."

As pressure to develop such architectures mounts, said Tapscott, CIOs are being dragged away from the traditional mainframe- and mini-computer-based environment and pushed toward one consisting primarily of workstations networked together under a client/server model. Because these new-age IT platforms require extensive data-sharing capabilities, he noted, they demand a level of interoperability that can only be achieved by adhering to standards. That should be the real motivation for moving to open systems, he claimed, and not the vague notion that a switch to open systems will provide benefits in and of itself. "All this talk about the advantages of open systems trivializes the real issue," he said. "This isn't about adopting Unix or any other individual technology. This is about understanding your business and designing an enterprise architecture."

Tapscott counsels that CIOs should stop worrying about the industry's inability to settle on a single set of standards and start worrying about their own foot-dragging in designing standards-based architectures. "It doesn't matter what version of Unix you choose," he said. "Standards can even be proprietary, like IBM's SAA. The point is, CIOs have to get their organizations moving along this path right now. We call it the Nike Law: Just do it."

—D. Freedman



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ey and doing a lot of foolish things."

Instead the company decided to leave its existing systems in place and to insert a new layer of Unix-based machines between those systems and the desktop. While the old systems continued to process data as they always had, the new, open layer would take the output of the older systems and massage it to provide additional functionality and graphical user interfaces. That way, NCR could perform all its maintenance and new development on its open systems, replacing the older systems piece by piece. "All our new work is Unix, client/server, fourth gen-

"IF YOU'RE SPENDING your dollars to get to a new level of sales rather than just to get from processing style A to . . . style B, then questions about standards aren't nearly as important."

—Thomas Pettibone

written for a client/server network of PCs. Most manufacturing-control functions are still performed by the mainframe and then integrated at the server level with the new functions for presentation to users. Soon the system's scrap-material module will be replaced by a client/server version, and so on, until eventually the entire system has been moved into the open-systems environment. "The users get exactly the applications they're looking for right away," said Hull, "and it buys us time to make the conversion at a comfortable pace."

The confusion about industry standards may not be reason enough to put off beginning a migration to open systems, but it can still give CIOs pause. New York Life Insurance Co. has begun moving to open systems, having laid out an architecture based entirely on industry-standard environments and networking. The fact that there currently are no agreed-upon industry standards is, of course, a matter of concern to Thomas Pettibone, senior vice president of information systems and services for New York Life.

"We're looking at two versions of Unix right now," Pettibone said, "and we're on the fence between them. We're going to start moving ahead with implementations of one of them, but we don't think we can afford to ignore the other. That's slowing us down."

To minimize the risks of going with a version of Unix that turns out to be less of a standard than another competing standard, Pettibone said that his group is taking pains to avoid those aspects of Unix that differ the most from version to version. "If a year from now we think we've made the wrong decision, it won't be all that much work to switch over," he said.

It also helps to keep your eye on where the payoffs from this potentially painful exercise are likely to come, Pettibone added. "If you're spending your dollars to get to a new level of sales rather than just to get from processing style A to processing style B, then questions about standards aren't nearly as important," he contended. "I feel the move to open systems is going to make dramatic inroads into business and is changing the CIO's job. And it's certainly a lot more fun than capacity planning." **CIO**

David Freedman is a freelance writer based in Brookline, Mass.



eration language," said Hull. "By doing it this way, we can get deliverables every three months, and without disrupting any business activities."

For example, NCR has a 12-year-old, mainframe-based manufacturing-control system that lacked the shop-floor parts-management capabilities necessary to support the company's shift to a just-in-time methodology. So Hull had the missing functions

JAMES HULL WAS FACED WITH A CHALLENGE WHEN NCR DECIDED TO BEGIN ITS CONVERSION TO OPEN SYSTEMS WHILE KEEPING EXISTING SYSTEMS IN PLACE. THE SOLUTION: INSERT A NEW LAYER OF UNIX-BASED MACHINES BETWEEN THE OLD SYSTEMS AND THE DESKTOP.

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OPEN SYSTEMS

OPEN SEASON

Everyone has an opinion when it comes to setting standards for open systems, which means the quest for uniformity is always confusing, sometimes acrimonious, and possibly very good for users

BY DAVID FREEDMAN

To an outsider, the effort to set open-systems standards has all the elements of a tragicomedy. How useful can standards be, one might wonder, if they are being churned out in competing versions by warring factions? The surprising answer: maybe pretty useful after all.

First, let's review the battlefield. At the forefront of the conflict over Unix's future there is the Open Software Foundation's OSF/1, backed by IBM, Digital Equipment and Hewlett-Packard, among others, facing off against Unix System V, the choice of Unix International backers AT&T and Sun, among others.

Other standards organizations that would like to have a say include the Advanced Computing Environment initiative, made up of 19 vendors supporting PC and reduced-instruction-set computing standards; the Corporation for Open Systems, with a joint membership of vendors and users; Uniform Association, which sponsors trade shows and assembles directories for its user-oriented membership; X/Open, which develops technical criteria for judging whether various products meet various standards; and the User Alliance for Open Systems, which gives its members an opportunity to throw

their collective weight around to influence the industry's direction.

Then, of course, there are the vendors, most of whom have a version of Unix they claim is perfectly compatible with, as well as better than, any other version of Unix. And a special place in this roundup must be accorded Microsoft, which single-handedly controls DOS, the most widely used operating system ever. Novell, meanwhile, is almost as well positioned in the area of PC networks.

Yes, it's true, vendors are throwing up a lot of dust in their scramble to manipulate the standards-forming process in their own interests. "They've all seized on open systems like motherhood, claiming their approach is better and cheaper, and creating some widespread confusion," noted Bud Huber, a senior information systems consultant at Hughes Aircraft Co., and chairman of the User Alliance for Open Systems, headquartered in McLean, Va. "But that's a natural outgrowth of sparring for market share, and the worst thing that's resulted is a corruption of the term open systems, so that no one really knows what it means anymore. The bottom-line goal is the same, though, and what we call it as we go along isn't of prime importance."

Roger McKee, director of marketing and member services for Uniform in Santa Clara, Calif., goes so far as to say that all



this pushing and pulling is actually a good thing. "I don't see it as a drawback that the open-systems world is divided," he said. "Having competition means that each organization will work even harder to listen to users' needs, and we'll end up with a better set of standards."

Besides, he added, there really isn't that much difference among the solutions offered by the various standards bodies. "Motif and Open Look are both good," he said, referring to the graphical user interfaces pushed by the Open Software Foundation and Unix International, respectively. "The variations between them or between the different Unices are very minor."

The lack of a single set of standards for open systems shouldn't be a problem at all for many user organizations, asserted O. Ray Pardo, chief telecommunications engineer at Bechtel, an engineering construction

"I DON'T SEE IT AS A DRAWBACK THAT THE OPEN-SYSTEMS world is divided. Having competition means that each organization will work even harder to listen to users' needs, and we'll end up with a better set of standards."

—Roger McKee

company, and chairman of the Corporation for Open Systems, also in McLean, Va. "If you need standards for systems that are only going to be used internally, you can just pick one and stick to it," he explained. "It's when you need your systems to interoperate with those of other companies that there's got to be some sort of agreement on standards." In those cases, he said, a company's best bet is to follow any guidelines set up by its particular industry.

So far, fairly specific standards have been established for manufacturers, airlines, utilities and banks; oil, construction and other



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TAKE ADVANTAGE OF CHANGESM

OPEN SYSTEMS

industries are close to doing so. Such industry-specific standards are more useful than general standards, according to Pardo, because they're tailored to an industry's requirements. The automotive industry, for example, has *two* sets of standards: one is well-suited for factory-floor applications; the

"ANYONE WHO DOESN'T JOIN THE PROCESS THIS YEAR WILL find themselves having to accept solutions created by others, including competitors. Missing out on the opportunity to help develop those solutions could be a strategic mistake."

—O. Ray Pardo

other, for electronic data interchange with suppliers.

Pardo also cautions companies against being fanatic about open systems. "If you're running a critical application on a proprietary platform, don't throw out the baby with the bathwater," he said. "Open systems shouldn't preclude incorporating a proprietary platform as long as you can make it interoperate with other systems at the message-handling and file-transfer levels." Bechtel is committed to standards based on Unix and DOS, Pardo noted, yet intends to operate proprietary operating systems on DEC minicomputers, IBM mainframes and Apple PCs.

As for all that talk about the standards-setting process being gridlocked, well, that's just misguided, insists David Tory, president and CEO of the Open Software Foundation in Cambridge, Mass. "If you look up close, you see bits of fur flying around, and it appears that we're in the center of a maelstrom," he said. "But if you step back a bit, it's clear that we're in the middle of the same process of evolution and sorting out that always precedes the setting of standards, whether it's for cars or VCRs." The fact that there are essentially two slightly different versions of Unix—OSF's and AT&T's—being pushed as standards should seem like real progress, Tory claimed, in view of the fact that a few years ago there were nearly 200 versions of more or less equal standing.

Anyway, Tory asks, what's the alternative to an organization such as OSF aggressively trying to drive the standards-setting process forward? "Users were much too frustrated waiting around for a de facto standard to emerge," he said. "We're speeding the process up."

Besides having released specifications for OSF/1 and Motif, OSF is also working on other standards, including the distributed-computing environment, which will enable otherwise incompatible systems to compute cooperatively; a scheme that will allow handling systems management for a conglomeration of platforms as if they were all in a common environment; and an architecture-neutral distribution format that will allow running an application on any platform without any modifications whatsoever.

Early versions of these projects will be out within a year, said Tory, which hardly leaves OSF open to charges that it's not getting much accomplished. "You can't provide a complete solution to these problems in one step," he said.

Will the move toward standards quash vendor innovation, as many skeptics charge? That seems unlikely, especially in view of the burst of hardware and software introductions that have accompanied the shift to open systems. Look for the pace of innovation to pick up even more as we get closer to standards, said Domenic LaCava, vice president of Unix-based software and systems at DEC. "Following standards frees a vendor up to innovate in areas it might otherwise not have been able to focus on," he said. "Digital is going to work on adding value in its traditional areas of expertise, such as networking, transaction processing and multiprocessing." Besides, he added, the standards-setting process will never be finished, thanks to a continuous stream of new technologies. "As each new value-added function comes forward from vendors," he said, "the user community will demand that standards be set for it."

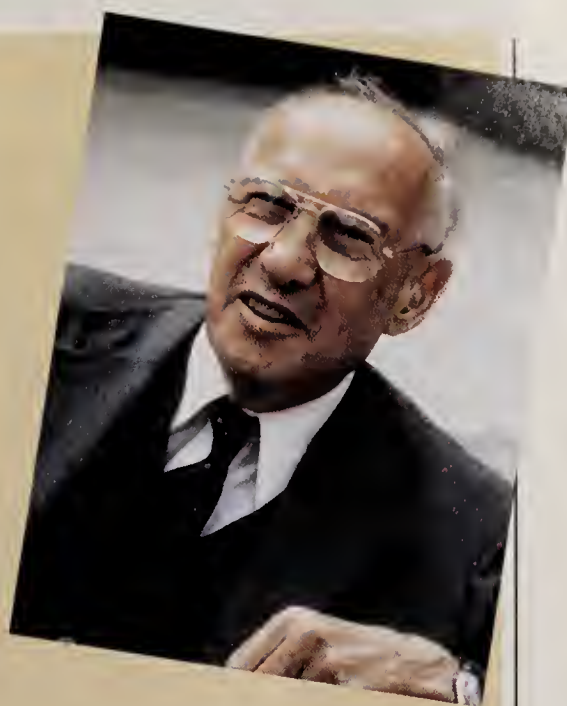
IT managers don't have to sit around waiting for all these developments; COS, Uniform and the User Alliance for Open Systems, as well as a raft of industry-specific bodies, actively solicit members from the user community. Better hurry, though. "Anyone who doesn't join the process this year will find themselves having to accept solutions created by others, including competitors," said COS's Pardo. "Missing out on the opportunity to help develop those solutions could be a strategic mistake."

But be forewarned of the hazards of putting in your two cents. "Half the time, when you raise your hand to point out a problem, you end up being assigned to the committee formed to solve that problem," said Pardo. **CIO**

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OPEN SYSTEMS

PROFILE

THE OPEN ROAD

Bowed, but not broken after an unfortunate early experience with Unix, DHL is embarking on an ambitious journey toward true open systems

BY DAVID FREEDMAN

Anyone who doesn't recognize that there is more to open systems than adopting Unix need only consider the case of DHL. The worldwide courier converted to Unix seven years ago, but according to Michael Lanier, senior vice president of MIS and CIO for DHL Worldwide Express's U.S. organization, the company still managed to end up with a bunch of incompatible machines operating on a stand-alone basis. In fact, DHL was probably worse off for having committed to Unix. "Until recently Unix hasn't been a mature product, lacking security, effective disk-management capabilities and a wide range of utilities," Lanier explained. "We were pioneers, and we have the arrows to show for it."

Some of the wounds were self-inflicted, said Lanier, the result of having plugged non-compliant custom software into that early open-systems environment. "We're paying for it now," he said. "The tough thing is to ensure that you don't create custom software that violates evolving open-systems standards." He stressed that an organization's commitment to open systems has to be carried through rigorously and consistently, "or else the advantages that come from an open-systems environment will be lost."

Now that DHL is determined to move to truly open systems, the company has em-

barked on an ambitious two-stage project: first, to integrate its existing systems, then to redesign the entire IT platform, piece by piece. Since Unix is clearly the environment of choice for such a scheme, DHL's hard-earned expertise is finally going to pay off. "We've got a running start," said Lanier.

Part of DHL's challenge is organizational. DHL is actually a group of separate companies serving different countries, loosely linked by contracts that allow them to use each other's facilities for international deliveries. One of these companies is devoted to providing worldwide IT services to the others; headquartered in Hong Kong, it is currently working on an international IT architecture. But Lanier, who is with DHL Airways, the company that serves the United States, felt his organization couldn't wait. "Our needs here in the U.S. were too pressing," he explained. "We had to do something if the business was going to move ahead."

So Lanier's group is moving ahead on its own. It is free to pick its own standards, as long as the resulting systems can later be linked with those of the other companies.

The first thing Lanier did was rebuild his IT organization, bringing in experts on open-systems architectures. Then the group performed an audit of existing systems in an effort to ferret out every source of incompatibility. "We found a lot of homegrown and customized code that had to be replaced," Lanier said. "From now on, everything will be strictly off-the-shelf, unless we absolutely



SNAPSHOT

DHL, a worldwide conglomeration of delivery companies serving different countries, is determined to move to open systems. The company has embarked on an ambitious two-stage project: first, to integrate its existing systems, then, to redesign the entire IT platform, piece by piece.

MICHAEL LANIER: "WE WERE PIONEERS, AND WE HAVE THE ARROWS TO SHOW FOR IT."

can't find what we're looking for—and then when it becomes available, we'll throw away whatever it was we built."

Now Lanier's group is integrating its various applications, which is proving to be no small task. "Even though our Unix minicomputers were networked, the software all ran pretty much in stand-alone fashion," he explained. Soon, however, every application from package tracking to import/export management will be swapping data. The company also dumped its proprietary network, moving to a new one tied to the airline's international network (since, in effect, DHL operates an airline for packages).

The next step is to move to a client/server architecture. "Minicomputers didn't provide us with the scalability we need," said Lanier. "If one of our systems at a particular

location ran out of room we had to go through an expensive replacement. Now we'll be able to simply add more memory or throw on an extra processor." As the new architecture is implemented, application by application and location by location, the company will move data into common repositories, easing data-management burdens.

DHL is about to throw the switch on its pilot application, a replacement of its telemarketing system that will be based on IBM workstations. So far the project looks as if it will do what Lanier has been hoping for, and more. "We think the system will reduce costs by 25 percent and improve the productivity of our telemarketing staff by 400 percent, providing a three-month payback. It's pretty wonderful when you can leverage new technology to create revenues." **CIO**

PHOTO BY DAVID POWERS

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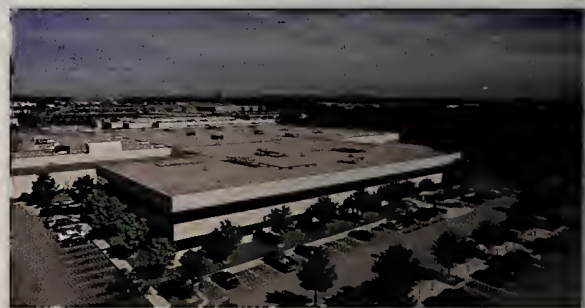


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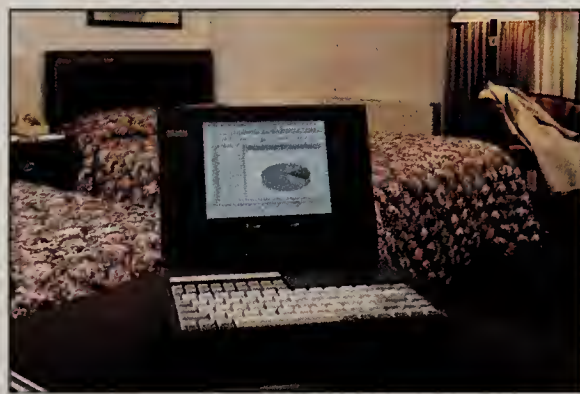
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Is the Pen Mightier?

Pen-based computing still has a few obstacles to overcome, but industry-watchers are predicting a brilliant future for this handy new technology

BY KATHLEEN MELYMUKA

The handwriting is on the wall. Pen-based computing is here, and it may be the missing link between the familiarity and ease of writing and the power of computing.

The advent of pen computing has the technology world gee-whizzing like nothing in recent memory. Forrester Research of Cambridge, Mass., calls it potentially far bigger than DOS. Portia Isaacson, coauthor of the market research study, "Pen PC Reports," calls pen the most important technology in the computer industry—ever.

The lure of the pen is its familiarity, intuitiveness, portability and ease of use. Users can operate pen-based computers while standing or walking, or where a desktop or portable unit would be impractical or inappropriate,

such as face-to-face meetings.

Pen units make computing easier for whole classes of users, including field-sales and service representatives, claims adjusters, retail suppliers, meter readers, delivery people, inventory clerks and health care providers. Pen computing may also facilitate new applications such as presentations or "what if" analyses done away from the office.

Pen users employ a stylus to write and draw on a digitized display that records and analyzes the data immediately. The units contain a handwriting-recognition engine that recognizes upper- and lower-case printing, numerals and some punctuation. They also include a recognition context manager that reduces translation error by telling the system what type of input to expect.

The engines are modular and user replaceable as the technology improves—and improvement is definitely needed. Because today's handwriting-recognition engines misinterpret about one in five words, pen users must rely on a kludgy system of hand-printing text, waiting for the computer to translate it into type, then editing the type for translation errors. As a result, existing units cannot handle extensive text entry, although users can get around this by calling up an on-screen virtual keyboard, available with most pen-computing systems.

Pen computing's greatest strength is currently its use of "gestures," or movements of the stylus, for minimal-text applications such as order entry and forms completion. Common gestures include drawing brackets to select a word, phrase or graphic; pressing and dragging to move a selection; tapping to select an icon; and drawing an *x* to delete, a caret to insert and a circle to correct. (When the user circles a word an



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The Document Company



edit-pad window opens where the correction may be written.) Some gestures are uniform across applications. Others can be defined for specific applications.

The more advanced systems can differentiate between text and gestures by the context. For example, they can tell whether a circle is the letter *o*, an indication that a word needs correcting or a shape in a drawing. They can also accept cur- sive handwriting and preserve it as a scanned image.

Some pen-based systems use the familiar cursor and fields for data entry, while others allow the user to write or draw anywhere on the screen. Users can "embed" or merge any live document—text, numeric or graphic—into any other and work on both together.

Another feature of some pen-based systems is deferred I/O, which stores orders to retrieve, fax, print and the like, when the computer is not connected to any facilities for accomplishing those tasks. Documents

are moved to an "out box," and when the machine is connected they are acted upon automatically. Similarly, whenever the system is connected it accepts any incoming data and places it in an "in" box.

Pen computers can be connected to and disconnected from various networks merely by plugging in the appropriate cables. They also support wireless networks.

The more advanced pen-computing operating systems use object-oriented design for memory management. In contrast to desktop GUI applications, which may require multiple megabytes of memory, object-oriented applications typically require only about 100K to 200K because the operating system conserves memory by eliminating redundant code. Developers can "inherit" most application behavior from components already included in the operating system. Because these objects are reusable, multiple applications do not require multiple copies of code.

Before pen eclipses everything that's come before, there are a few barriers to overcome. At four to five pounds, current systems are still twice as heavy as they should be for popular acceptance, according to Forrester. Displays are difficult to read out-of-doors, and the hardware cannot endure rough treatment. In addition, battery life is too short and applications too complex.

Support for pen-based computing is broad and growing, however, and a new generation of products is coming from major players including Apple, GRiD, NCR, Wang and IBM.

On the software side there are two major approaches to pen-based computing. Microsoft has been working for three years on Windows for Pen Computing (WPC), a pen interface to its Windows operating environment. Last spring it released developer toolkits for WPC, and commercial versions are expected around the end of the year.

Go Corp., of Foster City, Calif., meanwhile, offers PenPoint, a totally



new, pen-based operating system. A software developers' release debuted in February; a commercial version is expected at the end of the year.

Aside from release dates, the two approaches have little in common. Microsoft Windows for Pen Computing is based on the premise that the best thing for pen users is access to Windows technology and applications. WPC is a set of extensions to Microsoft Windows 3.1, including enhancements to the user interface, a gesture layer, a modular handwriting-recognition engine and a pen message interpreter that allows existing Windows and DOS applications to use the pen. The Pen Palette appears whenever WPC is started, providing icons for options menu, writing window, on-screen keyboard, insert space, insert return and backspace.

Current Windows applications will automatically take advantage of Windows for Pen Computing, so WPC provides a large pool of ready-made applications and the ability to run the same software on a pen machine and

a desktop. And since tens of thousands of developers already know how to write for Windows, new applications should be forthcoming.

In contrast, the design for Go Corp.'s product is based on the premise that users and applications in the pen market will be different from those in the traditional desktop market. Go's PenPoint is a compact, 32-bit, fully object-oriented, multitasking operating system designed specifically for mobile pen computers and non-technical people who may never have used a computer before.

PenPoint's user interface is organized like a notebook and combines intuitive navigation, gestures and handwriting translation. The Notebook User Interface allows users to work with "documents" rather than with applications and files. A table of contents lists all documents with their icon and page number. Related documents can be grouped.

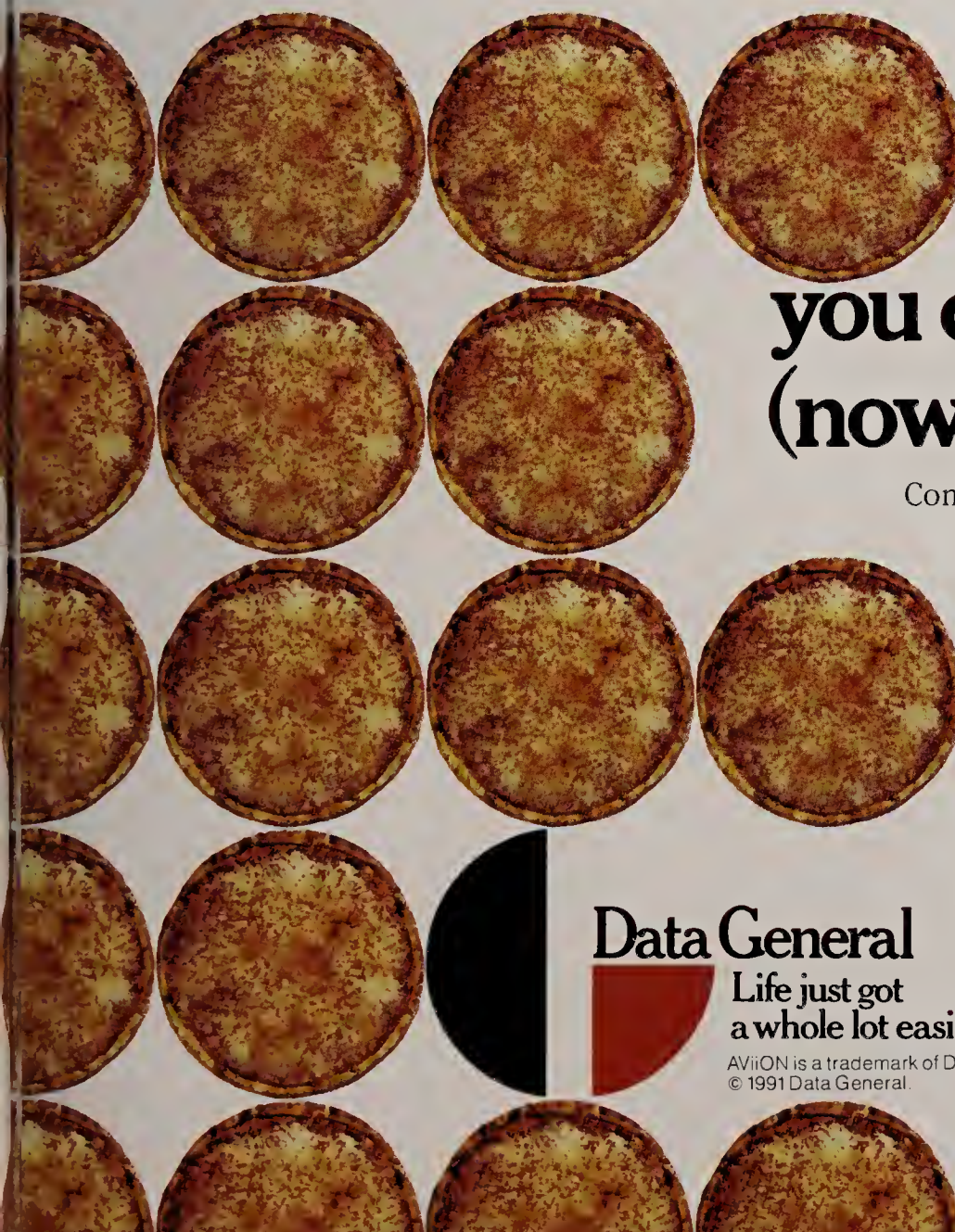
PenPoint starts up instantly and users move automatically to the last page on which they worked. To move

to another document the user touches a page number or the document icon. This automatically files the old data, exits that application and loads the new information. At the bottom of the table of contents is a "Bookshelf" from which users can access functions such as help, keyboard, and "in" and "out" baskets by touching the appropriate icon with the pen.

Experts currently give PenPoint the nod for what consultant Isaacson called its "robust, long-term, 21st-century operating system. It has an elegant, well-designed, state-of-the-art structure which DOS doesn't have. It's a work of art. Techies are awed by the design of it."

Both Microsoft and Go have a lot of momentum, and the competition between the two can only be good for users. "Both may or may not be shipped this year," said Isaacson, "but they've got themselves a horse race so both are trying harder." □

Kathleen Melymuka is a freelance writer based in Duxbury, Mass.



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Laptop Library

Atlas luggers, your load just got lighter. The first CD-ROM laptop has arrived. With the GRiDCase 1550cd, portable-computer users can have access to large databases, maps and charts normally stored on office PCs or on the old-fashioned bookshelf platform. The manufacturer, GRiD Systems Corp., also announced a lightweight 386SX-based notebook computer.

The GRiDCase 1550cd, with 635MB of read-only storage, weighs 17 pounds including CD drive and comes with a backlit VGA liquid-crystal display and Windows 3.0. An optional gas-plasma display affords extra brightness, contrast and viewing angle for graphics applications.

The GRiD 1750 weighs in at 6.7 pounds including battery pack—nearly a pound lighter than most notebooks, says the manufacturer. Once you're on the road, the resume-suspend function allows you to stop, then return to your work at the point where you left off without rebooting. When it's time to switch batteries, a five-minute "bridge battery" prevents data loss. An optional data-fax modem delivers 2400 bps data transmission and 9600 bps send-and-receive facsimile transmission.

The standard 1550cd package lists for \$6,590; the standard 1750, \$3,795. For more information, call 415 656-4700.



Show-It-Alls

Since "open systems" became an information age buzzphrase, IS managers at companies dominated by mainframe systems have struggled to provide front-end functionality and access across networks, while keeping strict controls on sensitive data and not slowing down their systems. All in all, a tall order. A new group of workstations and controllers from Harris Adacom, a Dallas-based network integrator, promises to ease the transition.

The Supernet Strategy 9800 Multi-Window Display Station System features a diskless workstation with a high resolution screen that allows IBM 3270 users to create up to four windows and work on as many as 16 applications at once. The workstation has enough power to process data sent from the mainframe by the controller and to handle all of the display processing locally.

The displays are connected to the controllers via a standard Ethernet network and are designed to work in multiplatform environments that include non-IBM mainframes and LANs. The product offers mouse support, user-definable keyboards, help screens for 3270 functions, customizable screens and cut-and-paste capabilities between windows. Controller prices range from \$12,000 to \$20,000, and terminals sell for \$2,200 to \$4,500. For more information, call 214 386-2000.

Public Display



It's the '90s, and *no one* hangs out by the watercooler anymore. But when employees aren't jawing via E-mail, they might find time to hover over the company multimedia kiosk. Direct their attention to that friendly touch-screen. The tubular design of the PDC 2300 Series, a 5-foot-high system enclosure, would look at home in any cafeteria, lobby or Starship Enterprise port. The shell houses standard interactive media components on three shelves and positions the monitor at optimum height and angle, including a comfortable resting position for the user's arms.

Intended for exhibit, banking, retail and training markets, the kiosk is available as a fully configured platform (with IBM PS/2 components and Pioneer laser disk player) or as an enclosure only. Base price for the enclosure starts at \$975, with volume discounts. For more information, call Pearson Development Corp. at 305 598-3018.

To Rome, with Savings

Gotten in the habit of faxing lunch orders to Maxim's? Two new products from Network Equipment Technologies Inc. (NET) can lower the cost of communicating across continents.

The ADN/60 reduces remote sites' monthly carrier costs for voice and data communications by using 8K and 16K voice compression and an efficient trunking protocol. It automatically reroutes communications over public switched services, such as Denmark's MegaNet and Switzerland's Megacom. The stand-alone Fax Digitizer sends digitized faxes over international private or public data circuits at 9600 or 4800 bps.

NET and IBM will begin product development and testing efforts to further integrate local and wide area communications. Among these are the NET LAN/WAN Exchange, which will integrate multi-vendor LAN internetworking communications with voice, video, data, image and fax communications. The companies will also develop frame relay products.

The ADN/60 starts at \$6,000, depending on configuration; the Fax Digitizer starts at \$2,500. NET can be reached at 415 366-4400.



Without a computer, finding the two that match could be murder.

Just ask the detectives who spent three years looking for the killer of a New Jersey prosecutor. All they had to go on was a fingerprint left at the crime scene. But with a million prints in police files, how could they make a match?

Only with the help of a computer. One that did what computers of a few years ago couldn't do: Compare millions of images for similarity. The computer nailed the murderer.

Police work isn't the only line of work that can benefit from the harnessing of computers to images. As Forbes pointed out in its November 26th cover story, oceanographers used this computer imaging technology to turn a warehouseful of data into a couple of file cabinets. One law firm used it to scan 325,000 pages of documents—a search that would have kept 100 paralegals busy day and night for four months.

The applications for computer imaging systems are so dazzling that one day nearly every office worker could be connected to or near one. What all this means to a sluggish

computer industry is growth. The kind of growth that will propel it into the year 2000, and beyond. The Forbes article contradicts Wall Street's conclusion that computers are just another cyclical capital goods industry.

Anyone can tell you what technology does today. Forbes tells you what it will do tomorrow. With gutsy, hard-hitting reporting.

As independent study after study shows, Forbes gives top executives better information and more insights than any of its competitors. In fact, Forbes carries far more editorial on computers than the others—47% more per average issue than Business Week, 89% more than Fortune.

Perhaps that explains why Forbes was the only major business magazine to show a gain in computer ad pages for 1990.

What's more, Forbes was the only major business magazine up in total ad pages last year.

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EVENTS

Integrated Enterprise: Moving Beyond Technology

The Grosvenor Resort at Walt Disney World Village, Orlando, Fla.

September 23-25

CAM-1 and Ernst & Young

817 860-1654

This forum features several executives discussing how multidimensional solutions have maximized their firms' investment in information and automation technology. Registration fees: \$595 for members; \$895 for nonmembers.

The 1991 Society for Information Management Annual Conference

Chicago Marriott Downtown, Chicago

October 6-10

Society for Information Management

312 644-6610

This conference showcases companies that use IT to achieve total quality and increased competitiveness. Featured are presentations by Malcolm Baldrige National Quality Award winners and other business experts. Also included are presentations focusing on how IT management can contribute to business success. Registration fees: \$250-\$1,495.

AME 1991 Annual Conference

Hilton at Walt Disney World Village, Orlando, Fla.

October 8-11

Association for Manufacturing Excellence

919 851-8917

Manufacturing professionals give presentations on strategic planning, self-directed work

teams, effective performance measures and other improvement strategies. Attendees have the opportunity to participate in continuous improvement sessions focusing on set-up reduction, benchmarking and scheduling pull signals in the job shop. Registration fees: \$595 for members; \$695 for nonmembers.

Electronic Messaging '91: Taking Care of Business

Fairmont Hotel, New Orleans

October 28-30

Electronic Mail Association

703 875-8620

This electronic-messaging industry conference focuses on messaging as it relates to business applications. Topics of discussion include mail-enabled applications, business strategies, EDI integration, LAN messaging, gateways and international messaging. Registration fees: \$245-\$295.

New Horizons to XPLOR 1991

Phoenix Civic Plaza Convention Center, Phoenix

November 17-22

XPLOR International

213 373-3633

This conference is designed for the electronic-document printing and publishing community. The sessions are divided into 12 tracks including general and industry applications, electronic forms, electronic reprographics, fundamentals of electronic printing, networking solutions and technology updates. Registration fees: \$150-\$825.

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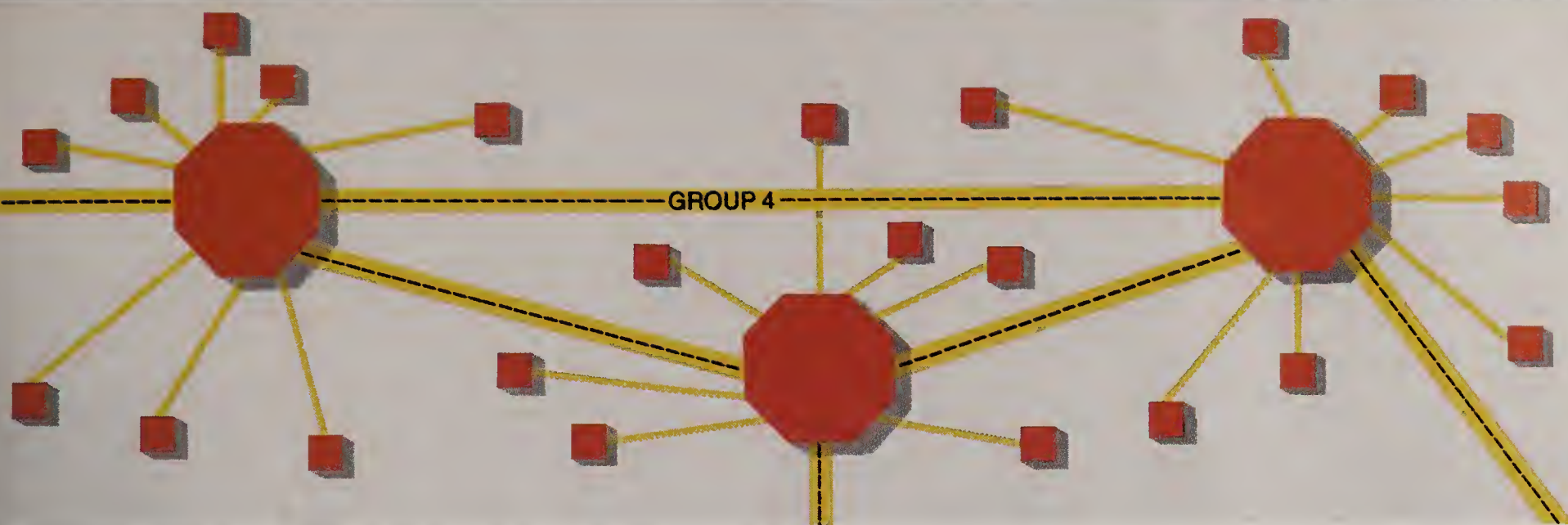
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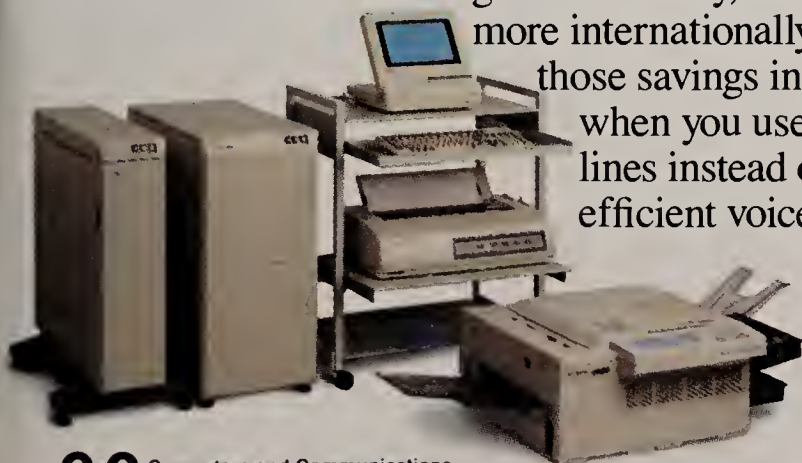


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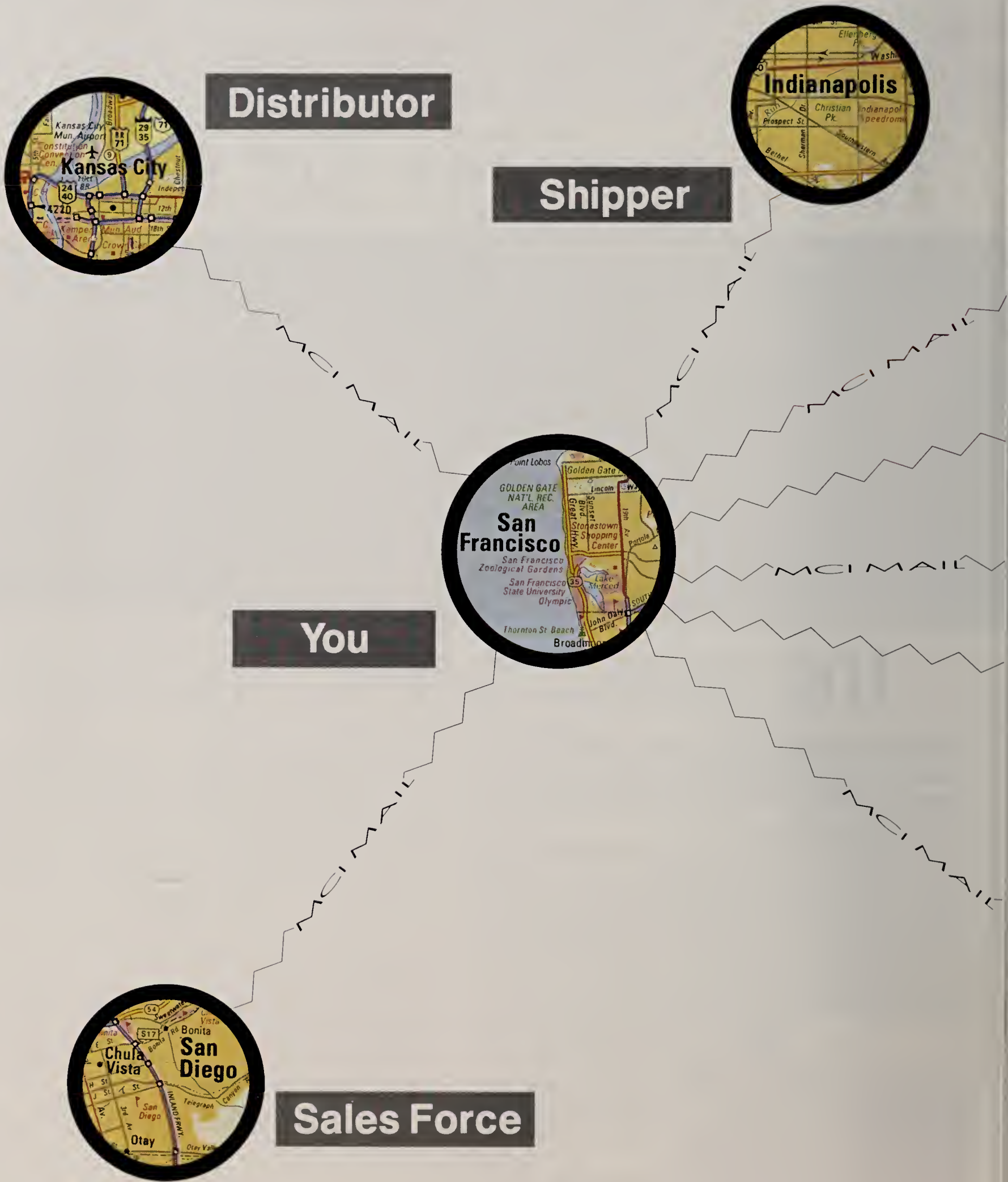
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